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<110> Abe, Yuki
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<150> JP 2000-116591

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atc
34203

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<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of *Aspergillus flavus*.

<220>

<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (9)..(9)

<223> i

<400> 3
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17

<210> 4

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of Aspergillus flavus.

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<221> modified_base

<222> (3)..(3)

<223> i

<220>

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<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (8)..(8)

<223> i

<220>

<221> modified_base

<222> (15)..(15)

<223> i

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17

<210> 5

<211> 19

<212> DNA

<213> Penicillium citrinum

<400> 5
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19

<210> 6

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 6

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19

<210> 7

<211> 18

<212> DNA

<213> *Penicillium citrinum*

<400> 7

gtcgcagtag catgggcc

18

<210> 8

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 8

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<210> 9

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 9
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<210> 10

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 10
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19

<210> 11

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 11
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<210> 12

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 12
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19

<210> 13

<211> 21

<212> DNA

<213> *Penicillium citrinum*

<400> 13

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21

<210> 14

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 14

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19

<210> 15

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 15

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20

<210> 16

<211> 21

<212> DNA

<213> *Penicillium citrinum*

<400> 16

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21

<210> 17

<211> 722

<212> DNA

<213> *Penicillium citrinum*

<400> 17

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120

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180

gtggtgtcaa cacaccatca aaactttggg agctgctcaa agagccccgg gatgtacaga
240

ccaagatccc taaggagaga tttgacgtcg atacatttta cagccccgat ggcactcacc
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ccgggcgcac gaacgcaccc tttgcatact tgctgcagga ggatctacgc ggttttgatg
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420

tgctggagac ggtctatgaa gctgtatcca acgcaggcct acggatccaa ggccttcaag
480

gatcctctac tgctgtgtac gtcggtatga tgacgcatga ctatgagact atcgtgacgc
540

gtgaattgga tagtattcct acatactctg ccacgggggt agctgtcagt gtggcctcca

600

accgtgtatc atacttcttc gactggcatg ggccgagtat gacgatcgac acagcctgta
660

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722

<210> 18

<211> 760

<212> DNA

<213> *Penicillium citrinum*

<400> 18

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120

aaccgcaacc gcaaccgcaa ccgcaaccgc aaccgcaatg gcaggctcgg cttgctctaa
180

cacatccacg ccattgcca tagttggaat gggatgtcga tttgctggag atgcaacgag
240

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300

ctcgcgattc aatgtgagag gagtatacca cccgaatggc gaaagggtcg ggtccacca
360

cgtaaagggt ggacacttca tcgacgagga tcctgcttta tttgacgccg cgttcttcaa
420

catgaccaca gaggtcgcca gctgcatgga tccgcagtat cggcttatgc ttgaggtggt
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600

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cttctacgac ttacgtggtc ccagcgtgac ggttgacacg gcctgttcga cgacattgac
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<210> 19

<211> 773

<212> DNA

<213> *Penicillium citrinum*

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480

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600

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660

cttgccgac gctactattg ccaagttgtt cggtaaaagc gaggagtggc aaaccgcacc
720

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773

<210> 20

<211> 527

<212> DNA

<213> *Penicillium citrinum*

<400> 20

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180

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300

ccaatttcta tccaaaacgg cgtgtctaca cccgatccat accgtttgca ccatagctat
360

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420

cgttgataaa gcagaatggg gctctttggt cgaaggaagt cgaagcttga tcaccggccc
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<210> 21

<211> 522

<212> DNA

<213> *Penicillium citrinum*

<400> 21

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actatagaag cgccgcgcag tagagattca caccgcccct tgaagcaaaa gtcggaagga
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420

ggtggtacgg cagtgccttat cttctggcta actgtgctct ccagcccctg gccggtaa
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<210> 22

<211> 541

<212> DNA

<213> *Penicillium citrinum*

<400> 22

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<210> 23

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 23

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<210> 24

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 24

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<210> 25

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 25

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<210> 26

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 26

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<210> 27

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 27
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<210> 28

<211> 20

<212> DNA

<213> Penicillium citrinum

<400> 28
ctttcccagc tgctactatc
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<210> 29

<211> 1524

<212> DNA

<213> Penicillium citrinum

<400> 29
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120

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240

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420

gaacactcgt cattttggca ttgccaatg agccactctc cgcttgaccc tgcttgtaat
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540

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1080

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1200

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1260

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1320

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1380

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1440

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1500

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<210> 30

<211> 784

<212> DNA

<213> *Penicillium citrinum*

<400> 30

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120

attaaatagt caggctcagc ccaggctcga ttcagattgg attcaggctt cagaccatgg
180

ccgctatgct ccttcgtact atacctccgt cgagctatac ccgcttggcc agacaaaagg
240

cttcactgaa cccttcaact taactgcatt tcgccacaac taactcgacg aggccggcga
300

tggtgttacc attcatgagc tcaaagatcg acacatcaac atggatttca gatgtgatcc
360

agtttcgaag ttcaatggcg acgagtgagt ctacgccgac acctgccagg tttttggacg
420

aggacatgtc gtcttctgcc agaccaaaca ttcgcatcag cttttccgtc attgctttga
480

ggacgataga aatggcctcg tcgtgagagg tgaccctgct tagttggggc cgcacgccat
540

ctggtccttt tttatgcgaa gagacaaaagg attggtctgc atgaaggact tggcgggtatt
600

taagtccac aaaccgctgt tcctgtatcc agtttgcctc ggtccagtga gcacccgggg
660

atgtgttgat tcctgtaacc acagctgcgg gaggtgatgg aaattgaggg gaagaacaca
720

ggattgcctt ctccaacaca tccatgacgt ccttttcatg cataggcttg taacctattc
780

tagc
784

<210> 31

<211> 764

<212> DNA

<213> *Penicillium citrinum*

<400> 31

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttcc gaataaaatg
60

cgttttattt tactaaccta ctgcactaat acagcaccta gtttctctgg gacggaaacc
120

attggaataa gcctggggac ggatgcatat ttgttttagt ttgcgtgtta tatcttagca
180

ccggtcatga gggagcggga tgtcctcggt gcgccggcgt accatgagct ttgtggttgg
240

atgcatacga acgctaaaag cgtgacggta gtatttgtca tcgtctcctg gtacaggctt
300

cacatcatat tgaatcagta tatgagcgag gagaatcttg atttccttcg aggcgaagaa
360

ccgcccggga caagcgcgtg ggttccagcc gaagccgatg tgatcaccgt tggattctc
420

caattgagcg gtgaaggcct tgtctggatc ctgcgcgatg cgcataaatc ggtagggatc
480

ataattttcg gggttttccc acacatcagg gttgttcatg cggctctgcag ccacagcggc
540

caactcgccc ttgggaatga agaggccatt ggatagagtg atgtctctga gagcgggtact
600

gcgcatagtg gcgcactcga ccggcttgat tcgctgcgtc tctttcatgc agctgtcgag
660

gagcttcagc ttgaacagag aggcaggcgt ccagccccct tctccgatta cagtgcggat
720

ctcttggcgg agaggctgaa taaggctctgg gtgcctggca atgt
764

<210> 32

<211> 765

<212> DNA

<213> *Penicillium citrinum*

<400> 32

aactggaaga attcgcggcc gcaggaatth tttttttttt ttttttctgg aaaaggacca
60

tctctttata tattcttctt ccctactact tgcatacgtaa atttcaacaa catataaaca
120

tgagataccc tttctggccg ttcactctac cacctgcctg tctcattgca ttgtgctttt
180

gaaaattatg acaataacaa ccaatgagaa aaaatatgat cctcctgcaa tgaatccact
240

ggagggggta cggagcttgg aatgctccta agattccgac ctaatcagcg tcgagcccga
300

tcagtagctg cagcactcgg cctcagtgca ttgttaggaa cagggactgt cctgggttccg
360

cctgacgggg agacacttcg agaaggggct gaagatgccg gggcagaacg gttgtgcgcc
420

atgtgcgcct tgaccaggtg accggcggct agggcagcac atagcgagag ctccccagcc
480

aaaacagcgc ttccgatgat gcgcgcaagt tgacgtgcat tctcaccggg agtgggtcggg
540

tgtgatccgc ggacaccaag catgtcaagc attgcgccct ggggctccag aatcgtagca
600

ccgcccacg ttccaacctc aatagacggc atggagacag agatttgaag cgatccgcga
660

agattgttca tgagagtgat gcagttagcg ctctccacaa cttgcgccgg atcctgacct
720

gtggcaatga aaatggctgc cgcaagattg gcagcttggg cgttg
765

<210> 33

<211> 802

<212> DNA

<213> *Penicillium citrinum*

<400> 33

aactggaaga attcgcggcc gcaggaattt tttttttttt tttttataga atctttgaaa
60

tcgacattaa ttaagtatgt ggagattcct tgtggaggca cggtaatgtg tctatctagc
120

aacgcggtca agcatcagtc tcaggcacag cccgggtgtc gtttttggtt gcaatcttcc
180

gccatcccat tccaaaggca aacacaaacg tgcacgccgt agctcccact gctaagtaaa
240

aagtatgatc aacggcgaga ctgtaagctt ttacaacccc tggaagggtta ttcttgctga
300

ccacatctct gaagccagtc gcccctgctg ccgtcacggc ctgcgtgtcg acagtgggcg
360

catacttgct caggccagtt ctcaaaccgg acccaaagac aaggtttagca aagtccagga
420

agagcgatcc tccaaacgtc tgtccaaaca cggcgagaga aattccgagg gcaccttggt
480

cgggcgaaag cgtgctttgg atggcgatga taggcgtttg catgccacaa ccacgaccga
540

agcccgcgat aaattggtac atgacccatt tcacagttga tgtatggggc tggaaggtgg
600

ataccagacc tgcgccctatg gcgacgagaa cagcgctgcc tagggcccaa ggcaaatagt
660

atcctgtctt tccaattgcg aagccagaaa ccatagccat aatgacttgt ccaagaattc
720

caggcaacat gtacacacca ctcaagtgtg gagaaacatc cttcacagcc tggaagtaga
780

tcggtagata gtaggaaaag ac
802

<210> 34

<211> 562

<212> DNA

<213> *Penicillium citrinum*

<400> 34

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttac taagcaatat
60

tgtgtttctt cgctaattgcg aatatttcct tatagcaacg tcgcaacaca tttatcgtct
120

tccttgaggc ctttgttgac ttgggctctt cgtctccggc ttcgtcactc caaagcacag
180

ataggagacg agaggccggc gttatggttt tattttcagc gccaaaggatt tgccacgatg
240

tgcttggcat atctgatagg actagacgaa tagatgccgc agccccgtgc tcctgtgcta
300

tcccaaagc agtctcaatc ccaactcaata gtcgaaggct tacacgcaat gtcgtgcatg
360

cagaagataa ggcgtgcatg aatgggtcga gatgtgaaat gagctcgccg atatgaagat
420

tagagtgaag cgagggaagt gcttcggctc ttccattgtc atttctagtg gttgagccag
480

accagtagca atccattcgt gtgctttgct tttgtccaca aggttgggct ttcattcacct
540

cggatagtag cagctgggaa ag
562

<210> 35

<211> 26

<212> DNA

<213> *Penicillium citrinum*

<400> 35
gttaacatgt cagaacctct accccc
26

<210> 36

<211> 27

<212> DNA

<213> *Penicillium citrinum*

<400> 36
aatatttcaa gcatcagtct caggcac
27

<210> 37

<211> 1662

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1662)

<400> 37

atg tca gaa cct cta ccc cct aaa gaa ggg gaa cca agg cca cag aag

48

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys

1

5

10

15

gaa gaa agt caa aat gac acg ctc gaa gcg act gag tcc aag tcc cag

96

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln

20

25

30

cac atc aca ggc ctc aag ctc ggg ctg gtg gtt gct tca gtt act ttc

144

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe

35

40

45

gta gca ttt ttg atg ctc ctt gat atg tcc att atc gtc acg gca atc

192

Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile

50

55

60

cca cat atc aca agc gag ttc cac tct ctg aac gat gta ggg tgg tac

240

Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr

65

70

75

80

ggc agt gct tat ctt ctg gct aac tgt gct ctc cag ccc ctg gcc ggt

288

Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly

85

90

95

aaa ttg tat aca ctc ttg ggc ttg aag tac act ttc ttt gcc ttc ctc

336

Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu

100	105	110
tgt att ttt gaa cta ggc tcg gtg cta tgc ggt gcc gca aga tct tcc		
384		
Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser		
115	120	125
acc atg ttg att gtt ggg cgg gcc gtt gct gga atg gga ggc tca ggt		
432		
Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly		
130	135	140
ctt gtc aac gga gcc ctc aca atc ctc tca aca gct gct cct aag cac		
480		
Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His		
145	150	155
aag caa cca gtt ttg att gga gtg atg atg ggt ctt agt cag att gcc		
528		
Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala		
165	170	175
att gtc tgt gga cca ctg ctc gga ggt gct ttc act caa cac gcc act		
576		
Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr		
180	185	190
tgg cga tgg tgc ttt tat atc aat ctc ccc atc ggc gct gtc gct gca		
624		
Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala		
195	200	205
ttc ctc ctt ctc gtc atc acc ata ccc gac cga att tca tcc acg gac		
672		
Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp		

210	215	220
agc gaa ctc tcg acc gac aaa cca atg gcc aac ata aaa tcc aca ctt		
720		
Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu		
225	230	235
cgc aaa ctg gac ctt gta ggc ttt gtg gtc ttt gca gcc ttc gca acc		
768		
Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr		
245	250	255
atg att tcc ctc gca cta gaa tgg gga ggg tcg acc tac acc tgg cga		
816		
Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg		
260	265	270
agt tcc gtc atc atc ggc ctg ttc tgt ggc gga ggg ttt gct ctg att		
864		
Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile		
275	280	285
gcg ttc gtg cta tgg gag cgt cat gtt ggc gat gct gtt gcc atg att		
912		
Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile		
290	295	300
cct ggc tca gtg gct ggt aaa cga caa gtg tgg tgc tct tgt tta ttt		
960		
Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe		
305	310	315
atg ggc ttt ttc tct ggc tcc ttg ctt gtc ttt tcc tac tat cta ccg		
1008		
Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro		
325	330	335

atc tac ttc cag gct gtg aag gat gtt tct ccc aca ctg agt ggt gtg
1056

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val

340

345

350

tac atg ttg cct gga att ctt gga caa gtc att atg gct atg gtt tct
1104

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser

355

360

365

ggc ttc gca att gga aag aca gga tac tat ttg cct tgg gcc cta ggc
1152

Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly

370

375

380

agc gct gtt ctc gtc gcc ata ggc gca ggt ctg gta tcc acc ttc cag
1200

Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln

385

390

395

400

ccc cat aca tca act gtg aaa tgg gtc atg tac caa ttt atc gcg ggc
1248

Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly

405

410

415

ttc ggt cgt ggt tgt ggc atg caa acg cct atc atc gcc atc caa agc
1296

Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser

420

425

430

acg ctt tcg ccc gaa caa ggt gcc ctc gga att tct ctc gcc gtg ttt
1344

Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe

435

440

445

gga cag acg ttt gga gga tcg ctc ttc ctg gac ttt gct aac ctt gtc
1392

Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val

450

455

460

ttt ggg tcc ggt ttg aga act ggc ctg agc aag tat gcg ccc act gtc
1440

Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val

465

470

475

480

gac acg cag gcc gtg acg gca gca ggg gcg act ggc ttc aga gat gtg
1488

Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val

485

490

495

gtc agc aag aat aac ctt cca ggg gtt gta aaa gct tac agt ctc gcc
1536

Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala

500

505

510

gtt gat cat act ttt tac tta gca gtg gga gct acg gcg tgc acg ttt
1584

Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe

515

520

525

gtg ttt gcc ttt gga atg gga tgg cgg aag att gca acc aaa aac gac
1632

Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp

530

535

540

acc cgg gct gtg cct gag act gat gct tga
1662

Thr Arg Ala Val Pro Glu Thr Asp Ala

545

550

<210> 38

<211> 553

<212> PRT

<213> Penicillium citrinum

<400> 38

Met	Ser	Glu	Pro	Leu	Pro	Pro	Lys	Glu	Gly	Glu	Pro	Arg	Pro	Gln	Lys
1				5					10					15	

Glu	Glu	Ser	Gln	Asn	Asp	Thr	Leu	Glu	Ala	Thr	Glu	Ser	Lys	Ser	Gln
			20					25					30		

His	Ile	Thr	Gly	Leu	Lys	Leu	Gly	Leu	Val	Val	Ala	Ser	Val	Thr	Phe
		35					40					45			

Val	Ala	Phe	Leu	Met	Leu	Leu	Asp	Met	Ser	Ile	Ile	Val	Thr	Ala	Ile
	50					55					60				

Pro	His	Ile	Thr	Ser	Glu	Phe	His	Ser	Leu	Asn	Asp	Val	Gly	Trp	Tyr
65					70					75					80

Gly	Ser	Ala	Tyr	Leu	Leu	Ala	Asn	Cys	Ala	Leu	Gln	Pro	Leu	Ala	Gly
				85					90					95	

Lys	Leu	Tyr	Thr	Leu	Leu	Gly	Leu	Lys	Tyr	Thr	Phe	Phe	Ala	Phe	Leu
			100					105					110		

Cys	Ile	Phe	Glu	Leu	Gly	Ser	Val	Leu	Cys	Gly	Ala	Ala	Arg	Ser	Ser
		115					120					125			

Thr	Met	Leu	Ile	Val	Gly	Arg	Ala	Val	Ala	Gly	Met	Gly	Gly	Ser	Gly
	130					135					140				

Leu	Val	Asn	Gly	Ala	Leu	Thr	Ile	Leu	Ser	Thr	Ala	Ala	Pro	Lys	His
145					150					155					160

Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala
 165 170 175

Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr
 180 185 190

Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala
 195 200 205

Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp
 210 215 220

Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu
 225 230 235 240

Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr
 245 250 255

Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg
 260 265 270

Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile
 275 280 285

Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile
 290 295 300

Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe
 305 310 315 320

Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro
 325 330 335

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val
 340 345 350

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser

355		360		365
Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly				
370		375		380
Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln				
385		390		395
Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly				
		405		410
				415
Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser				
		420		425
				430
Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe				
		435		440
				445
Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val				
		450		455
				460
Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val				
465		470		475
				480
Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val				
		485		490
				495
Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala				
		500		505
				510
Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe				
		515		520
				525
Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp				
		530		535
				540
Thr Arg Ala Val Pro Glu Thr Asp Ala				
545		550		

<210> 39

<211> 31

<212> DNA

<213> *Penicillium citrinum*

<400> 39

ggatccatgt ccctgccgca tgcaacgatt c
31

<210> 40

<211> 30

<212> DNA

<213> *Penicillium citrinum*

<400> 40

ggatccctaa gcaatattgt gtttcttcgc
30

<210> 41

<211> 1380

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1380)

<400> 41

atg tcc ctg ccg cat gca acg att ccg acg aac cta cgc cgt cgc gcg

48

Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala

1

5

10

15

ttt cga cgc tca tgt gac cgg tgt cat gca caa aag ctc aaa tgt acc

96

Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr

20

25

30

ggc agc aat gcc aat tta gtc cgt gct cag tgt caa cgt tgt caa caa

144

Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln

35

40

45

gcc gga tta agg tgt gtg tac agc gaa agg cta ccc aag cgc aat tta

192

Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu

50

55

60

cat aaa gaa gcc gca gct gga act aca aga gcc aca gaa acc tca caa

240

His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln

65

70

75

80

ccg atg acc gcg aca tct tct acg gtc ttc tca tca ttg gca gag act

288

Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr

85

90

95

cct cca cct tac tgc tca cca cct acg cat att ggc acc tcg gca ctc

336

Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu

100

105

110

aag gaa aca tta tca gaa cca tca gcg gca acc ctg caa ttc tat gat

384

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp

115

120

125

aca tca atc aac ttt gat gat ccc gag tcg ttt ccc ggc ggc tgg cct
432

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro

130

135

140

cag cca aat aca ttt cgc gac gat gcc aac agc aat gaa tct tcg ggc
480

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly

145

150

155

160

ata cca gat cta ggc tac gac ttt gaa ggc cct ttg gat gca acg gcg
528

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala

165

170

175

cct gtc tcg cca tcg ctg ttt gac ctc gaa gta gag ggg aac tcg tca
576

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser

180

185

190

tcc gga caa tcc aac aca agc aac acg caa cga gac ctt ttc gaa agt
624

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser

195

200

205

ctg tcg gat gtg tca cag gac cta gag gta ata ctc cac ggg gtg act
672

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr

210

215

220

gtg gaa tgg ccc aag caa aaa att tta agc tac ccg ata ggg gac ttt
720

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe

225	230	235	240
ttg aat gcc ttt ggt aga ttg cta cta cat ctt caa gaa cgt gtg atc			
768			
Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile			
	245	250	255
acg agc agc aat agc agc atg tta gat ggg tgt ctg caa acc aag aac			
816			
Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn			
	260	265	270
ttg ttc atg gcg gtg cat tgc tac atg ttg tct gtc aaa atc atg aca			
864			
Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr			
	275	280	285
tca ctt tcc cag ctg cta cta tcc gag gtg atg aaa gcc caa cct tgt			
912			
Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys			
	290	295	300
gga caa aag caa agc aca cga atg gat tgg tac tgg tct ggc tca acc			
960			
Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr			
305	310	315	320
act aga aat gac aat gga aga gcc gaa gca ctt ccc tcg ttt cac tct			
1008			
Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser			
	325	330	335
aat ctt cat atc ggc gag ctc att tca cat ctc gac cca ttc atg cac			
1056			
Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His			

340	345	350
gcc tta tct tct gca tgc acg aca ttg cgt gta agc ctt cga cta ttg		
1104		
Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu		
355	360	365
agt gag att gag act gct ttg ggg ata gca cag gag cac ggg gct gcg		
1152		
Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala		
370	375	380
gca tct att cgt cta gtc cta tca gat atg cca agc aca tcg tgg caa		
1200		
Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln		
385	390	395
atc ctt ggc gct gaa aat aaa acc ata acg ccg gcc tct cgt ctc cta		
1248		
Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu		
405	410	415
tct gtg ctt tgg agt gac gaa gcc gga gac gaa gag ccc aag tca aca		
1296		
Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr		
420	425	430
aag gcc tca ggg aag acg ata aat gtg ttg cga cgt tgc tat aag gaa		
1344		
Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu		
435	440	445
ata ttc gca tta gcg aag aaa cac aat att gct tag		
1380		
Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala		
450	455	

<210> 42

<211> 459

<212> PRT

<213> *Penicillium citrinum*

<400> 42

Met	Ser	Leu	Pro	His	Ala	Thr	Ile	Pro	Thr	Asn	Leu	Arg	Arg	Arg	Ala
1				5					10					15	

Phe	Arg	Arg	Ser	Cys	Asp	Arg	Cys	His	Ala	Gln	Lys	Leu	Lys	Cys	Thr
			20					25					30		

Gly	Ser	Asn	Ala	Asn	Leu	Val	Arg	Ala	Gln	Cys	Gln	Arg	Cys	Gln	Gln
		35					40					45			

Ala	Gly	Leu	Arg	Cys	Val	Tyr	Ser	Glu	Arg	Leu	Pro	Lys	Arg	Asn	Leu
	50					55					60				

His	Lys	Glu	Ala	Ala	Ala	Gly	Thr	Thr	Arg	Ala	Thr	Glu	Thr	Ser	Gln
65					70					75					80

Pro	Met	Thr	Ala	Thr	Ser	Ser	Thr	Val	Phe	Ser	Ser	Leu	Ala	Glu	Thr
				85					90					95	

Pro	Pro	Pro	Tyr	Cys	Ser	Pro	Pro	Thr	His	Ile	Gly	Thr	Ser	Ala	Leu
			100					105					110		

Lys	Glu	Thr	Leu	Ser	Glu	Pro	Ser	Ala	Ala	Thr	Leu	Gln	Phe	Tyr	Asp
		115					120					125			

Thr	Ser	Ile	Asn	Phe	Asp	Asp	Pro	Glu	Ser	Phe	Pro	Gly	Gly	Trp	Pro
	130					135					140				

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly
145 150 155 160

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala
165 170 175

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser
180 185 190

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser
195 200 205

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr
210 215 220

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe
225 230 235 240

Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile
245 250 255

Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn
260 265 270

Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr
275 280 285

Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys
290 295 300

Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr
305 310 315 320

Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser
325 330 335

Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His
340 345 350

Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
 355 360 365

Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
 370 375 380

Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
 385 390 395 400

Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
 405 410 415

Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
 420 425 430

Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
 435 440 445

Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala
 450 455

<210> 43

<211> 9099

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(9099)

<400> 43

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 48

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
 1 5 10 15

ggt tgt cgg ttt cca ggt ggt gtc aac aca cca tca aaa ctt tgg gag
 96
 Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
 20 25 30

ctg ctc aaa gag ccc cgg gat gta cag acc aag atc cct aag gag aga
 144
 Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
 35 40 45

ttt gac gtc gat aca ttt tac agc ccc gat ggc act cac ccc ggg cgc
 192
 Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
 50 55 60

acg aac gca ccc ttt gca tac ttg ctg cag gag gat cta cgc ggt ttt
 240
 Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
 65 70 75 80

gat gcc tct ttc ttc aac atc caa gct gga gag gcc gaa acg att gac
 288
 Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
 85 90 95

cca cag caa agg ctg ctg ctg gag acg gtc tat gaa gct gta tcc aac
 336
 Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
 100 105 110

gca ggc cta cgg atc caa ggc ctt caa gga tcc tct act gct gtg tac
 384
 Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr

115	120	125	
gtc ggt atg atg acg cat gac tat gag act atc gtg acg cgt gaa ttg			
432			
Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu			
130	135	140	
gat agt att cct aca tac tct gcc acg ggg gta gct gtc agt gtg gcc			
480			
Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala			
145	150	155	160
tcc aac cgt gta tca tac ttc ttc gac tgg cat ggg ccg agt atg acg			
528			
Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr			
165	170	175	
atc gac aca gcc tgt agt tca tcc tta gct gcc gtg cat ctg gcc gtc			
576			
Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val			
180	185	190	
caa cag ctt aga acg ggc gag agt acc atg gcg gtt gca gcc ggt gcg			
624			
Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala			
195	200	205	
aat ctg ata ttg ggc ccc atg acc ttt gta atg gag agc aaa ttg aac			
672			
Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn			
210	215	220	
atg ctg tcc ccc aat ggt aga tct cga atg tgg gat gct gct gcc gat			
720			
Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp			

225 230 235 240

gga tat gcc aga gga gaa ggt gtt tgc tct att gtc ctg aaa acg ctg
768

Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu

245 250 255

agc cag gca ctg cgc gac ggg gac agt atc gag tgt gtt atc cga gag
816

Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu

260 265 270

acc ggt atc aac caa gat ggc cga acg aca ggt atc aca atg cca aac
864

Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn

275 280 285

cat agc gca caa gaa gcc ctc att cgg gcc aca tat gcc aag gct ggt
912

His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly

290 295 300

ctt gat att acc aac ccc cag gaa cgc tgc cag ttc ttt gaa gcc cat
960

Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His

305 310 315 320

gga act ggt aca cca gcc ggt gac cca cag gaa gct gag gct att gca
1008

Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala

325 330 335

aca gcc ttc ttc gga cac aag gat gga aca atc gac agc gac ggc gag
1056

Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu

340 345 350

aaa gat gag ctt ttt gtc ggc agc atc aag aca gtt ctc ggt cac acg
1104

Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr

355

360

365

gaa ggc act gct ggt att gcg ggc tta atg aag gca tcg ttt gct gta
1152

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val

370

375

380

cga aat ggc gtg atc ccg cca aac ctg ctg ttt gag aag atc agt ccc
1200

Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro

385

390

395

400

cgt gtc gct ccg ttc tat acg cac ttg aaa att gca acg gag gcc aca
1248

Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr

405

410

415

gaa tgg ccg att gtt gcg ccc ggg cag cct cgc aga gtc agc gtt aat
1296

Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn

420

425

430

tca ttt gga ttt ggt ggt aca aat gcc cat gct att atc gaa gag tat
1344

Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr

435

440

445

atg gct cct cca cac aag ccg aca gca gtg gta aca gag gtg acc tca
1392

Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser

450

455

460

gat gca gat gca tgc agc ttg ccc ctt gtg ctt tca tcg aag tcg cag
1440

Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln

465

470

475

480

cgc tcc atg aag gca acg cta gaa aat atg ctc caa ttt ctg gaa acg
1488

Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr

485

490

495

cat gat gac gtg gac atg cat gat atc gca tat acc tta ctt gag aaa
1536

His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys

500

505

510

cgg tct atc ttg ccc ttc cgt cgt gcg att gca gca cac aac aag gaa
1584

Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu

515

520

525

gta gcc cgc gcg gca ctg gag gct gcc atc gcg gac ggt gag gtc gtc
1632

Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val

530

535

540

acc gac ttc cgc acc gac gcg aat gac aac cct cgc gta cta ggt gtc
1680

Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val

545

550

555

560

ttt act ggc caa ggt gca cag tgg ccg ggc atg ctg aag aag ctc atg
1728

Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met

565

570

575

gtg ggt atg cca ttt gtg aga ggc att ctc gaa gag ctg gat aat tca

1776

Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser

580

585

590

ctg caa aca ctg cct gaa aag tat cgg cct acg tgg aca ctg tat gac

1824

Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp

595

600

605

cag ctc atg ctt gaa ggg gat gcc tca aac gtc aga ctc gcc agc ttc

1872

Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe

610

615

620

tcc cag cct cta tgc tgc gcc gta caa atc gtt ctg gtc cga ctt ctc

1920

Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu

625

630

635

640

gct gca gct ggt atc gag ttc agt gca att gtc ggc cac agt tca ggt

1968

Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly

645

650

655

gag att gcc tgt gcc ttt gcg gca gga ttc atc agt gcc act caa gct

2016

Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala

660

665

670

atc cgt att gcg cat ctg cgt gga gtt gtg tcc gcg gag cat gcc tct

2064

Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser

675

680

685

tct cca agc ggc cag aca ggc gct atg cta gcg gca ggt atg tcg tac

2112

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
 690 695 700

gat gac gca aag gaa cta tgc gag ctc gaa gcc ttt gag ggt cgg gtc
 2160
 Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
 705 710 715 720

tgc gtc gcc gct agc aat tca ccg gat agt gtg acc ttc tcc ggc gac
 2208
 Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
 725 730 735

atg gat gct atc cag cac gtt gaa ggt gtc ttg gag gat gaa tcc act
 2256
 Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
 740 745 750

ttt gcc aga atc ttg aga gtt gac aag gcc tac cat tcg cat cac atg
 2304
 Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
 755 760 765

cac cca tgc gca gct cca tat gtc aag gca ttg ctg gag tgc gac tgt
 2352
 His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys
 770 775 780

gct gtt gcc gat ggc caa ggt aac gat agt gtt gct tgg ttc tct gcc
 2400
 Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala
 785 790 795 800

gtc cac gag acc agc aag caa atg act gta cag gat gtg atg ccc gct
 2448
 Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala

805	810	815
tat tgg aaa gac aat ctc gtc tct ccg gtc ttg ttc tcg cag gct gtg		
2496		
Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val		
820	825	830
cag aaa gca gtc atc act cat cgt cta atc gac gtc gcc atc gaa att		
2544		
Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile		
835	840	845
ggc gcc cac cct gct ctc aag ggt ccg tgt cta gcc acc atc aag gat		
2592		
Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp		
850	855	860
gct ctt gcc ggt gtg gag ctg ccg tat acc ggg tgc ttg gca cga aac		
2640		
Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn		
865	870	875
880		
gtt gac gat gtg gac gct ttt gct gga ggt ctg gga tac att tgg gag		
2688		
Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu		
885	890	895
cgt ttc gga gtt cgg agt atc gac gcc gag ggc ttc gta caa caa gtc		
2736		
Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val		
900	905	910
cgg ccc gat cgt gcc gtt caa aac ctg tca aag tca ttg ccc aca tac		
2784		
Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr		

915	920	925
tct tgg gat cat act cgt caa tac tgg gca gaa tct cgc tcc acc cgc		
2832		
Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg		
930	935	940
cag cat ctt cgt gga ggt gcg ccc cat ctt ctg ctt gga aag ctt tct		
2880		
Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser		
945	950	955
tct tac agc aca gca tcg acc ttc cag tgg aca aac ttc atc agg ccc		
2928		
Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro		
965	970	975
cgg gat ctg gaa tgg ctc gac ggt cat gcg cta caa ggc cag act gtg		
2976		
Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val		
980	985	990
ttc ccc gct gct ggg tac ata att atg gcc atg gaa gct gcc atg aag		
3024		
Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys		
995	1000	1005
gtg gct ggt gag cgt gcc gcc caa gtt cag ctc ctg gaa atc ttg		
3069		
Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu		
1010	1015	1020
gac atg agc atc aac aaa gcc atc gtg ttt gaa gat gaa aac acc		
3114		
Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr		
1025	1030	1035

tcc gtg gag ctg aac ttg aca gcc gaa gtc acc agt gac aat gat
3159

Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp

1040

1045

1050

gcg gat ggc caa gtc acg gtc aaa ttt gtt att gat tcc tgt ctg
3204

Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu

1055

1060

1065

gca aag gag agt gag ctt tcg aca tcc gcc aaa ggc caa atc gtc
3249

Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val

1070

1075

1080

ata acc ctt ggc gag gca tca ccg tca tcg cag ctt ttg ccg cca
3294

Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro

1085

1090

1095

cct gag gaa gag tac ccc cag atg aac aat gtc aac atc gat ttc
3339

Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe

1100

1105

1110

ttc tat cgg gaa ctt gac ctc ctt ggg tat gac tac agc aaa gac
3384

Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp

1115

1120

1125

ttc cgt cgt ttg cag acc atg aga agg gcc gac tcc aaa gct agc
3429

Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser

1130

1135

1140

ggc acc ttg gct ttc ctt cca ctt aag gat gaa ttg cgc aat gag
3474

Gly Thr Leu Ala Phe Leu Pro Leu Lys Asp Glu Leu Arg Asn Glu

1145

1150

1155

ccc ctc ttg ctc cac cca gcg ccc ctg gac atc gcg ttc cag act
3519

Pro Leu Leu Leu His Pro Ala Pro Leu Asp Ile Ala Phe Gln Thr

1160

1165

1170

gtc att gga gcg tat tcc tct cca gga gat cgt cgc cta cgc tca
3564

Val Ile Gly Ala Tyr Ser Ser Pro Gly Asp Arg Arg Leu Arg Ser

1175

1180

1185

ttg tac gtg cct act cac gtt gac aga gtg act ctg att cca tcg
3609

Leu Tyr Val Pro Thr His Val Asp Arg Val Thr Leu Ile Pro Ser

1190

1195

1200

ctc tgt ata tcg gcg ggt aat tct ggt gaa acc gag ctt gcg ttt
3654

Leu Cys Ile Ser Ala Gly Asn Ser Gly Glu Thr Glu Leu Ala Phe

1205

1210

1215

gac aca atc aac aca cac gac aag ggt gat ttc ctg agc ggc gac
3699

Asp Thr Ile Asn Thr His Asp Lys Gly Asp Phe Leu Ser Gly Asp

1220

1225

1230

atc acg gtg tac gat tcg acc aag aca acg ctt ttc caa gtt gat
3744

Ile Thr Val Tyr Asp Ser Thr Lys Thr Thr Leu Phe Gln Val Asp

1235

1240

1245

aac att gtc ttt aag cct ttc tct ccc ccg act gct tcg acc gac

3789
 Asn Ile Val Phe Lys Pro Phe Ser Pro Pro Thr Ala Ser Thr Asp
 1250 1255 1260

 cac cga atc ttc gca aag tgg gtc tgg gga ccc ctc acg ccc gaa
 3834
 His Arg Ile Phe Ala Lys Trp Val Trp Gly Pro Leu Thr Pro Glu
 1265 1270 1275

 aaa ctg ctg gag gac cct gcg acg ttg atc ata gct cgg gac aag
 3879
 Lys Leu Leu Glu Asp Pro Ala Thr Leu Ile Ile Ala Arg Asp Lys
 1280 1285 1290

 gag gac att ctg acc atc gag cga atc gtt tac ttc tac atc aaa
 3924
 Glu Asp Ile Leu Thr Ile Glu Arg Ile Val Tyr Phe Tyr Ile Lys
 1295 1300 1305

 tcc ttc cta gcc cag ata acc ccc gac gac cgt caa aat gcc gac
 3969
 Ser Phe Leu Ala Gln Ile Thr Pro Asp Asp Arg Gln Asn Ala Asp
 1310 1315 1320

 ctc cat tcc cag aag tac att gaa tgg tgt gac cag gtt cag gcc
 4014
 Leu His Ser Gln Lys Tyr Ile Glu Trp Cys Asp Gln Val Gln Ala
 1325 1330 1335

 gat gct cgg gct ggc cac cat cag tgg tac cag gag tct tgg gag
 4059
 Asp Ala Arg Ala Gly His His Gln Trp Tyr Gln Glu Ser Trp Glu
 1340 1345 1350

 gag gac act tct gtt cac att gag caa atg tgt gaa agc aac tcg
 4104

Glu Asp Thr Ser Val His Ile Glu Gln Met Cys Glu Ser Asn Ser
 1355 1360 1365

tcc cac cca cat gtg cgc ctg atc caa agg gta ggc aaa gaa tta
 4149
 Ser His Pro His Val Arg Leu Ile Gln Arg Val Gly Lys Glu Leu
 1370 1375 1380

att tca att gtt cgc ggg aac ggg gat cct ttg gat atc atg aac
 4194
 Ile Ser Ile Val Arg Gly Asn Gly Asp Pro Leu Asp Ile Met Asn
 1385 1390 1395

cgc gat ggg ttg ttc acc gag tac tat acc aac aag ctc gcc ttt
 4239
 Arg Asp Gly Leu Phe Thr Glu Tyr Tyr Thr Asn Lys Leu Ala Phe
 1400 1405 1410

ggc tca gca ata cac gtc gtt cag gat ctg gtt agc caa att gct
 4284
 Gly Ser Ala Ile His Val Val Gln Asp Leu Val Ser Gln Ile Ala
 1415 1420 1425

cat cgc tac caa tcc att gat atc ctt gag atc ggc ttg ggt aca
 4329
 His Arg Tyr Gln Ser Ile Asp Ile Leu Glu Ile Gly Leu Gly Thr
 1430 1435 1440

ggc atc gcc acg aag cgc gtt ctt gca tca cct caa ctt ggt ttc
 4374
 Gly Ile Ala Thr Lys Arg Val Leu Ala Ser Pro Gln Leu Gly Phe
 1445 1450 1455

aac agt tac act tgc act gac atc tcg gcg gat gtt att ggc aag
 4419
 Asn Ser Tyr Thr Cys Thr Asp Ile Ser Ala Asp Val Ile Gly Lys

1460	1465	1470
gcc cgt gaa caa ctt tcc gaa ttc gac ggt ctc atg cag ttt gag 4464		
Ala Arg Glu Gln Leu Ser Glu Phe Asp Gly Leu Met Gln Phe Glu		
1475	1480	1485
gca cta gac atc aac aga agc cca gca gag caa gga ttc aag cct 4509		
Ala Leu Asp Ile Asn Arg Ser Pro Ala Glu Gln Gly Phe Lys Pro		
1490	1495	1500
cac tcc tac gat ctg att att gca tcc gat gtc ctc cat gcc agc 4554		
His Ser Tyr Asp Leu Ile Ile Ala Ser Asp Val Leu His Ala Ser		
1505	1510	1515
tcc aac ttc gag gaa aaa ttg gct cac ata agg tcc ttg ctc aag 4599		
Ser Asn Phe Glu Glu Lys Leu Ala His Ile Arg Ser Leu Leu Lys		
1520	1525	1530
ccg ggt ggt cac ttg gtt act ttc ggg gtc acc cat cgc gag cct 4644		
Pro Gly Gly His Leu Val Thr Phe Gly Val Thr His Arg Glu Pro		
1535	1540	1545
gct cgc ctc gcc ttc atc tct ggg ctt ttc gct gat cga tgg act 4689		
Ala Arg Leu Ala Phe Ile Ser Gly Leu Phe Ala Asp Arg Trp Thr		
1550	1555	1560
gga gaa gac gaa act cgt gct ttg agt gcc tcg ggg tcc gtt gac 4734		
Gly Glu Asp Glu Thr Arg Ala Leu Ser Ala Ser Gly Ser Val Asp		

1565	1570	1575
caa tgg 4779	gag cat acc ctc aag	aga gtt ggg ttc tct ggc gtc gat
Gln Trp	Glu His Thr Leu Lys	Arg Val Gly Phe Ser Gly Val Asp
1580	1585	1590
agt cgg 4824	aca ctt gat cga gag	gat gat ttg atc ccg tct gtc ttc
Ser Arg	Thr Leu Asp Arg Glu	Asp Asp Leu Ile Pro Ser Val Phe
1595	1600	1605
agt aca 4869	cat gct gtg gat gcc	acc gtt gag cgt ttg tat gat cca
Ser Thr	His Ala Val Asp Ala	Thr Val Glu Arg Leu Tyr Asp Pro
1610	1615	1620
ctt tct 4914	gct cca ttg aag gac	tca tac ccg cca tta gtg gtt atc
Leu Ser	Ala Pro Leu Lys Asp	Ser Tyr Pro Pro Leu Val Val Ile
1625	1630	1635
ggg ggc 4959	gaa tcg aca aaa acc	gaa cgc att ttg aac gac atg aaa
Gly Gly	Glu Ser Thr Lys Thr	Glu Arg Ile Leu Asn Asp Met Lys
1640	1645	1650
gct gcc 5004	cta ccg cat aga cac	atc cac tcc gtc aag cgg ctg gaa
Ala Ala	Leu Pro His Arg His	Ile His Ser Val Lys Arg Leu Glu
1655	1660	1665
agt gtt 5049	ctc gac gac ccg gcc	ttg cag cct aag tcg act ttt gtc
Ser Val	Leu Asp Asp Pro Ala	Leu Gln Pro Lys Ser Thr Phe Val
1670	1675	1680

atc ctc tcg gaa ctt gat gat gaa gtg ttt tgc aac ctt gaa gag
5094

Ile Leu Ser Glu Leu Asp Asp Glu Val Phe Cys Asn Leu Glu Glu

1685

1690

1695

gac aag ttt gag gca gtc aag tct ctt ctc ttc tac gcc gga cgc
5139

Asp Lys Phe Glu Ala Val Lys Ser Leu Leu Phe Tyr Ala Gly Arg

1700

1705

1710

atg atg tgg ctg aca gag aat gcc tgg att gat cat ccc cac cag
5184

Met Met Trp Leu Thr Glu Asn Ala Trp Ile Asp His Pro His Gln

1715

1720

1725

gcc agc acc atc gga atg ttg agg aca atc aag ctc gag aac cct
5229

Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro

1730

1735

1740

gac ttg gga acg cac gtc ttc gat gtc gat act gtg gag aac cta
5274

Asp Leu Gly Thr His Val Phe Asp Val Asp Thr Val Glu Asn Leu

1745

1750

1755

gac acc aaa ttc ttc gtt gag caa ctt ttg cgc ttc gag gag agc
5319

Asp Thr Lys Phe Phe Val Glu Gln Leu Leu Arg Phe Glu Glu Ser

1760

1765

1770

gat gat cag ctt ttg gaa tca ata aca tgg act cat gag ccc gaa
5364

Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu

1775

1780

1785

gtg tac tgg tgc aag ggt cgt gcc tgg gtc cct cgt ttg aag cag
 5409
 Val Tyr Trp Cys Lys Gly Arg Ala Trp Val Pro Arg Leu Lys Gln
 1790 1795 1800

gat att gct agg aac gac cgt atg aac tcg tct cgt cgt cca att
 5454
 Asp Ile Ala Arg Asn Asp Arg Met Asn Ser Ser Arg Arg Pro Ile
 1805 1810 1815

ttc ggt aac ttt aat tcg tcc aag acg gcc att gca ctg aaa gag
 5499
 Phe Gly Asn Phe Asn Ser Ser Lys Thr Ala Ile Ala Leu Lys Glu
 1820 1825 1830

gcg agg gga gca tcc tca tcg atg tac tat ctt gag tca acc gag
 5544
 Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu
 1835 1840 1845

acg tgt gat tcg tta gaa gac gct cgt cat gct gga aaa gca act
 5589
 Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr
 1850 1855 1860

gtt cgt gtt cgc tac gct ctt ccc cag gca att cgc gtg ggc cat
 5634
 Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His
 1865 1870 1875

ctc gga tac ttc cat gtc gtg cag ggc agt att ctg gag aat aca
 5679
 Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr
 1880 1885 1890

tgt gag gtg cct gta gtc gcc ctg gct gag aag aat gga tct ata

5724
 Cys Glu Val Pro Val Val Ala Leu Ala Glu Lys Asn Gly Ser Ile
 1895 1900 1905

 ctg cat gta ccg aga aac tac atg cat agt ctg ccc gat aac atg
 5769
 Leu His Val Pro Arg Asn Tyr Met His Ser Leu Pro Asp Asn Met
 1910 1915 1920

 gcg gaa ggc gag gat agt tcc ttc ttg ttg tcc aca gct gca gcc
 5814
 Ala Glu Gly Glu Asp Ser Ser Phe Leu Leu Ser Thr Ala Ala Ala
 1925 1930 1935

 ctc ctt gcc gaa aca att ctc tct agc gct cag tcc ttt ggc tct
 5859
 Leu Leu Ala Glu Thr Ile Leu Ser Ser Ala Gln Ser Phe Gly Ser
 1940 1945 1950

 gat gca tca att ctg att atg gag ccc cca atc ttc tgc gtc aaa
 5904
 Asp Ala Ser Ile Leu Ile Met Glu Pro Pro Ile Phe Cys Val Lys
 1955 1960 1965

 gca att ctg gag tcg gcc aaa acc tac ggt gtt cag gtt cat ttg
 5949
 Ala Ile Leu Glu Ser Ala Lys Thr Tyr Gly Val Gln Val His Leu
 1970 1975 1980

 gca aca act ctg tcc gac gtc aaa act att ccg gct cct tgg atc
 5994
 Ala Thr Thr Leu Ser Asp Val Lys Thr Ile Pro Ala Pro Trp Ile
 1985 1990 1995

 cga tta cat gcc aag gaa acc gac gct cgg ctg aaa cac agc ctg
 6039

Arg	Leu	His	Ala	Lys	Glu	Thr	Asp	Ala	Arg	Leu	Lys	His	Ser	Leu
2000						2005					2010			

ccg	aca	aac	atg	atg	gca	ttc	ttt	gac	ttg	tct	acc	gac	cgg	act
6084														
Pro	Thr	Asn	Met	Met	Ala	Phe	Phe	Asp	Leu	Ser	Thr	Asp	Arg	Thr
2015						2020					2025			

gct	gcc	ggg	ata	acc	aac	cgt	ttg	gcc	aag	ttg	cta	cca	ccc	agt
6129														
Ala	Ala	Gly	Ile	Thr	Asn	Arg	Leu	Ala	Lys	Leu	Leu	Pro	Pro	Ser
2030						2035					2040			

tgc	ttc	atg	tac	agt	ggt	gac	tat	ctt	atc	cga	agt	aca	gct	tcc
6174														
Cys	Phe	Met	Tyr	Ser	Gly	Asp	Tyr	Leu	Ile	Arg	Ser	Thr	Ala	Ser
2045						2050					2055			

aca	tac	aaa	gtt	agt	cat	gtt	gag	gat	att	cca	atc	ctc	gag	cac
6219														
Thr	Tyr	Lys	Val	Ser	His	Val	Glu	Asp	Ile	Pro	Ile	Leu	Glu	His
2060						2065					2070			

tct	gtg	gca	atg	gca	aaa	aat	acc	gtc	tct	gcg	tcg	act	gtc	gac
6264														
Ser	Val	Ala	Met	Ala	Lys	Asn	Thr	Val	Ser	Ala	Ser	Thr	Val	Asp
2075						2080					2085			

gac	act	gag	aaa	gtt	att	aca	gcc	aca	caa	att	ctc	ttg	cct	ggt
6309														
Asp	Thr	Glu	Lys	Val	Ile	Thr	Ala	Thr	Gln	Ile	Leu	Leu	Pro	Gly
2090						2095					2100			

cag	ctc	tct	gtc	aac	cac	aat	gac	caa	cgc	ttc	aat	ctg	gcc	acc
6354														
Gln	Leu	Ser	Val	Asn	His	Asn	Asp	Gln	Arg	Phe	Asn	Leu	Ala	Thr

2105	2110	2115
gtc atc 6399	gac tgg aag gaa aat	gag gtg tcc gct agg att tgc ccc
Val Ile	Asp Trp Lys Glu Asn	Glu Val Ser Ala Arg Ile Cys Pro
2120	2125	2130
atc gac 6444	tct ggt aac tta ttt	tcc aac aag aag acg tat ttg ctt
Ile Asp	Ser Gly Asn Leu Phe	Ser Asn Lys Lys Thr Tyr Leu Leu
2135	2140	2145
gtt ggt 6489	ctt acc ggg gac ctt	ggt cgc tct ctc tgt cgc tgg atg
Val Gly	Leu Thr Gly Asp Leu	Gly Arg Ser Leu Cys Arg Trp Met
2150	2155	2160
atc ttg 6534	cat ggc gcc cgc cat	gtt gtg ctc act agc cgg aac cct
Ile Leu	His Gly Ala Arg His	Val Val Leu Thr Ser Arg Asn Pro
2165	2170	2175
cga ctt 6579	gat ccc aaa tgg atc	gcc aac atg gag gca ctt ggt ggt
Arg Leu	Asp Pro Lys Trp Ile	Ala Asn Met Glu Ala Leu Gly Gly
2180	2185	2190
gac atc 6624	acc gtt ctg tca atg	gat gtt gcc aat gag gat tca gtc
Asp Ile	Thr Val Leu Ser Met	Asp Val Ala Asn Glu Asp Ser Val
2195	2200	2205
gat gct 6669	ggc ctt ggc aag ctt	gtc gat atg aag ttg cca cct gtt
Asp Ala	Gly Leu Gly Lys Leu	Val Asp Met Lys Leu Pro Pro Val

2210	2215	2220
gcc ggc 6714	atc gcg ttc ggg cct	ttg gtg ctg cag gat gtc atg ctg
Ala Gly	Ile Ala Phe Gly Pro	Leu Val Leu Gln Asp Val Met Leu
2225	2230	2235
aag aac 6759	atg gac cac cag atg	atg gac atg gtg ttg aag ccc aag
Lys Asn	Met Asp His Gln Met	Met Asp Met Val Leu Lys Pro Lys
2240	2245	2250
gta caa 6804	gga gca cgc att ctt	cat gaa cgg ttc tcc gaa cag acg
Val Gln	Gly Ala Arg Ile Leu	His Glu Arg Phe Ser Glu Gln Thr
2255	2260	2265
ggc agc 6849	aag gcg ctc gac ttc	ttc atc atg ttt tcg tcc att gtt
Gly Ser	Lys Ala Leu Asp Phe	Phe Ile Met Phe Ser Ser Ile Val
2270	2275	2280
gca gtt 6894	att ggc aat cct ggc	cag tcc aac tat ggc gct gcg aat
Ala Val	Ile Gly Asn Pro Gly	Gln Ser Asn Tyr Gly Ala Ala Asn
2285	2290	2295
gcc tac 6939	cta cag gct ctg gcc	cag caa cgg tgc gcc aga gga ttg
Ala Tyr	Leu Gln Ala Leu Ala	Gln Gln Arg Cys Ala Arg Gly Leu
2300	2305	2310
gcg gga 6984	tca acc atc gat att	ggg gcc gtt tac ggt gta ggg ttt
Ala Gly	Ser Thr Ile Asp Ile	Gly Ala Val Tyr Gly Val Gly Phe
2315	2320	2325

gtc acg agg gcc gag atg gag gag gac ttt gat gct atc cgt ttc
7029

Val Thr Arg Ala Glu Met Glu Glu Asp Phe Asp Ala Ile Arg Phe

2330

2335

2340

atg ttt gac tca gtt gaa gag cat gag ctg cac acg ctt ttc gcc
7074

Met Phe Asp Ser Val Glu Glu His Glu Leu His Thr Leu Phe Ala

2345

2350

2355

gaa gcg gtc gtg tct gac cag cgt gcc cgg cag caa cca cag cgc
7119

Glu Ala Val Val Ser Asp Gln Arg Ala Arg Gln Gln Pro Gln Arg

2360

2365

2370

aag acg gtc att gac atg gcg gac ctt gag ctt acc acg ggt atc
7164

Lys Thr Val Ile Asp Met Ala Asp Leu Glu Leu Thr Thr Gly Ile

2375

2380

2385

cca gat ctt gac cct gcg ctt caa gat cga att att tac ttc aac
7209

Pro Asp Leu Asp Pro Ala Leu Gln Asp Arg Ile Ile Tyr Phe Asn

2390

2395

2400

gac cct cgt ttc gga aac ttc aaa att ccc ggt caa cgc gga gac
7254

Asp Pro Arg Phe Gly Asn Phe Lys Ile Pro Gly Gln Arg Gly Asp

2405

2410

2415

ggt ggc gac aat gga tca ggg tct aaa ggc tcc att gcc gac cag
7299

Gly Gly Asp Asn Gly Ser Gly Ser Lys Gly Ser Ile Ala Asp Gln

2420

2425

2430

ctc aaa caa gca aca act tta gac caa gtt cgg caa atc gtg att
7344

Leu Lys Gln Ala Thr Thr Leu Asp Gln Val Arg Gln Ile Val Ile

2435

2440

2445

gat ggt cta tct gag aaa ctc cgt gtt acc ctc caa gtt tcg gac
7389

Asp Gly Leu Ser Glu Lys Leu Arg Val Thr Leu Gln Val Ser Asp

2450

2455

2460

ggg gag agc gtg gac cca acc att cct ctc att gat caa ggt gtc
7434

Gly Glu Ser Val Asp Pro Thr Ile Pro Leu Ile Asp Gln Gly Val

2465

2470

2475

gac tcc ttg ggt gca gtg act gtc ggc tca tgg ttc tca aag caa
7479

Asp Ser Leu Gly Ala Val Thr Val Gly Ser Trp Phe Ser Lys Gln

2480

2485

2490

ctc tac ctt gac ctc cca ctc ttg agg gta ctt ggc ggt gct tct
7524

Leu Tyr Leu Asp Leu Pro Leu Leu Arg Val Leu Gly Gly Ala Ser

2495

2500

2505

gtc gct gat ctt gcc gac gac gcg gcc acc cga ctc cca gct aca
7569

Val Ala Asp Leu Ala Asp Asp Ala Ala Thr Arg Leu Pro Ala Thr

2510

2515

2520

tcc att ccg ctg ctg ttg caa att ggt gat tcc acg gga acc tcg
7614

Ser Ile Pro Leu Leu Leu Gln Ile Gly Asp Ser Thr Gly Thr Ser

2525

2530

2535

gac agc ggg gct tct ccg aca cca aca gac agc cat gat gaa gca

7659
 Asp Ser Gly Ala Ser Pro Thr Pro Thr Asp Ser His Asp Glu Ala
 2540 2545 2550

 agc tct gct acc agc aca gat gcg tcg tca gcc gaa gag gat gaa
 7704
 Ser Ser Ala Thr Ser Thr Asp Ala Ser Ser Ala Glu Glu Asp Glu
 2555 2560 2565

 gag caa gag gac gat aat gag cag gga ggc cgt aag att ctt cgt
 7749
 Glu Gln Glu Asp Asp Asn Glu Gln Gly Gly Arg Lys Ile Leu Arg
 2570 2575 2580

 cgc gag agg ttg tcc ctt ggc cag gag tat tcc tgg agg cag caa
 7794
 Arg Glu Arg Leu Ser Leu Gly Gln Glu Tyr Ser Trp Arg Gln Gln
 2585 2590 2595

 caa atg gta aaa gat cat acc atc ttc aac aac act att ggc atg
 7839
 Gln Met Val Lys Asp His Thr Ile Phe Asn Asn Thr Ile Gly Met
 2600 2605 2610

 ttc atg aag ggt acc att gac ctc gac cgg ttg agg cgg gct ctg
 7884
 Phe Met Lys Gly Thr Ile Asp Leu Asp Arg Leu Arg Arg Ala Leu
 2615 2620 2625

 aaa gcc tca ttg cgc cgt cac gag atc ttc cgt acg tgc ttt gtt
 7929
 Lys Ala Ser Leu Arg Arg His Glu Ile Phe Arg Thr Cys Phe Val
 2630 2635 2640

 act ggc gat gac tat agc agc gat tta aat ggt ccc gtc caa gtg
 7974

Thr Gly Asp Asp Tyr Ser Ser Asp Leu Asn Gly Pro Val Gln Val
 2645 2650 2655

gtt ctc aag aac ccg gag aac aga gtg cac ttt gtt cag gtg aac
 8019
 Val Leu Lys Asn Pro Glu Asn Arg Val His Phe Val Gln Val Asn
 2660 2665 2670

aac gct gcg gag gca gag gaa gag tac cgg aaa ctc gag aag aca
 8064
 Asn Ala Ala Glu Ala Glu Glu Glu Tyr Arg Lys Leu Glu Lys Thr
 2675 2680 2685

aac tat agc atc tcc aca ggt gac act ctc aga ctc gtt gat ttc
 8109
 Asn Tyr Ser Ile Ser Thr Gly Asp Thr Leu Arg Leu Val Asp Phe
 2690 2695 2700

tac tgg ggc aca gat gac cac ctg ttg gta atc ggc tac cac aga
 8154
 Tyr Trp Gly Thr Asp Asp His Leu Leu Val Ile Gly Tyr His Arg
 2705 2710 2715

tta gtt ggt gat ggc tca aca aca gaa aac ctg ttc aat gag atc
 8199
 Leu Val Gly Asp Gly Ser Thr Thr Glu Asn Leu Phe Asn Glu Ile
 2720 2725 2730

ggg cag att tac agc ggg gtg aaa atg cag cga cca tcg acc caa
 8244
 Gly Gln Ile Tyr Ser Gly Val Lys Met Gln Arg Pro Ser Thr Gln
 2735 2740 2745

ttc tct gat cta gcc gtc caa cag cgg gaa aac ctg gaa aat ggg
 8289
 Phe Ser Asp Leu Ala Val Gln Gln Arg Glu Asn Leu Glu Asn Gly

2750	2755	2760
cga atg 8334	ggg gac gat atc gcg	ttc tgg aag tcc atg cat agc aaa
Arg Met	Gly Asp Asp Ile Ala	Phe Trp Lys Ser Met His Ser Lys
2765	2770	2775
gtc tcg 8379	tca tct gcg cca acc	gtg ctt ccc atc atg aat ctg atc
Val Ser	Ser Ser Ala Pro Thr	Val Leu Pro Ile Met Asn Leu Ile
2780	2785	2790
aat gac 8424	cct gct gcc aat tca	gag cag cag caa ata cag cca ttc
Asn Asp	Pro Ala Ala Asn Ser	Glu Gln Gln Gln Ile Gln Pro Phe
2795	2800	2805
acg tgg 8469	cag cag tat gaa gca	att gct cgt tta gat ccc atg gtc
Thr Trp	Gln Gln Tyr Glu Ala	Ile Ala Arg Leu Asp Pro Met Val
2810	2815	2820
gcc ttc 8514	cga atc aaa gag cgg	agc cgc aag cac aag gca acc ccc
Ala Phe	Arg Ile Lys Glu Arg	Ser Arg Lys His Lys Ala Thr Pro
2825	2830	2835
atg cag 8559	ttc tac ctg gcc gcc	tac cac gtt ttg ttg gcg cgt ctt
Met Gln	Phe Tyr Leu Ala Ala	Tyr His Val Leu Leu Ala Arg Leu
2840	2845	2850
acc ggc 8604	agc aaa gac ata acc	atc ggc ctc gcc gaa acc aac cga
Thr Gly	Ser Lys Asp Ile Thr	Ile Gly Leu Ala Glu Thr Asn Arg

2855	2860	2865
tcc acc 8649 Ser Thr	atg gaa gaa att tcg Met Glu Glu Ile Ser	gcg atg ggc ttt ttc Ala Met Gly Phe Phe
		gct aac gtg Ala Asn Val
2870	2875	2880
ctt ccc 8694 Leu Pro	ctg cgc ttt gat gag Leu Arg Phe Asp Glu	ttc gtc ggc agc aag Phe Val Gly Ser Lys
		aca ttc ggc Thr Phe Gly
2885	2890	2895
gag cac 8739 Glu His	ctt gta gcc acc aag Leu Val Ala Thr Lys	gac agt gtg cgt gag Asp Ser Val Arg Glu
		gcc atg caa Ala Met Gln
2900	2905	2910
cac gcg 8784 His Ala	cgg gtg ccg tat ggc Arg Val Pro Tyr Gly	gtc atc ctc gac tgt Val Ile Leu Asp Cys
		cta ggc ctg Leu Gly Leu
2915	2920	2925
aat ctc 8829 Asn Leu	cct acc tca ggc gag Pro Thr Ser Gly Glu	gaa ccc aag act cag Glu Pro Lys Thr Gln
		aca cac gcc Thr His Ala
2930	2935	2940
ccc ttg 8874 Pro Leu	ttc cag gct gtc ttt Phe Gln Ala Val Phe	gat tac aag cag ggt Asp Tyr Lys Gln Gly
		caa gcg gag Gln Ala Glu
2945	2950	2955
agt ggc 8919 Ser Gly	tca att ggc aat gcc Ser Ile Gly Asn Ala	aaa atg acg agt gtt Lys Met Thr Ser Val
		ctc gct tcc Leu Ala Ser
2960	2965	2970

cgt gag cgc act cct tat gac atc gtt ctc gag atg tgg gat gac
8964

Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp

2975

2980

2985

cct acc aag gac cca ctc att cat gtc aaa ctt cag agc tcg ctg
9009

Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu

2990

2995

3000

tat ggc cct gag cac gct cag gcc ttt gta gac cac ttt tct tca
9054

Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser

3005

3010

3015

atc ctc act atg ttc tcg atg aac ccg gct ctg aag ttg gcc tag
9099

Ile Leu Thr Met Phe Ser Met Asn Pro Ala Leu Lys Leu Ala

3020

3025

3030

<210> 44

<211> 3032

<212> PRT

<213> Penicillium citrinum

<400> 44

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1 5 10 15

Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
20 25 30

Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
 35 40 45

Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
 50 55 60

Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
 65 70 75 80

Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
 85 90 95

Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
 100 105 110

Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr
 115 120 125

Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu
 130 135 140

Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala
 145 150 155 160

Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr
 165 170 175

Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val
 180 185 190

Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala
 195 200 205

Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn
 210 215 220

Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp
 225 230 235 240

Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu
 245 250 255

Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu
 260 265 270

Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn
 275 280 285

His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly
 290 295 300

Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His
 305 310 315 320

Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala
 325 330 335

Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu
 340 345 350

Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr
 355 360 365

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val
 370 375 380

Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro
 385 390 395 400

Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr
 405 410 415

Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn
 420 425 430

Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr

435		440		445											
Met	Ala	Pro	Pro	His	Lys	Pro	Thr	Ala	Val	Val	Thr	Glu	Val	Thr	Ser
	450					455						460			
Asp	Ala	Asp	Ala	Cys	Ser	Leu	Pro	Leu	Val	Leu	Ser	Ser	Lys	Ser	Gln
465					470					475					480
Arg	Ser	Met	Lys	Ala	Thr	Leu	Glu	Asn	Met	Leu	Gln	Phe	Leu	Glu	Thr
				485					490					495	
His	Asp	Asp	Val	Asp	Met	His	Asp	Ile	Ala	Tyr	Thr	Leu	Leu	Glu	Lys
			500					505					510		
Arg	Ser	Ile	Leu	Pro	Phe	Arg	Arg	Ala	Ile	Ala	Ala	His	Asn	Lys	Glu
		515					520					525			
Val	Ala	Arg	Ala	Ala	Leu	Glu	Ala	Ala	Ile	Ala	Asp	Gly	Glu	Val	Val
	530					535					540				
Thr	Asp	Phe	Arg	Thr	Asp	Ala	Asn	Asp	Asn	Pro	Arg	Val	Leu	Gly	Val
545					550					555					560
Phe	Thr	Gly	Gln	Gly	Ala	Gln	Trp	Pro	Gly	Met	Leu	Lys	Lys	Leu	Met
				565					570					575	
Val	Gly	Met	Pro	Phe	Val	Arg	Gly	Ile	Leu	Glu	Glu	Leu	Asp	Asn	Ser
			580					585					590		
Leu	Gln	Thr	Leu	Pro	Glu	Lys	Tyr	Arg	Pro	Thr	Trp	Thr	Leu	Tyr	Asp
		595					600					605			
Gln	Leu	Met	Leu	Glu	Gly	Asp	Ala	Ser	Asn	Val	Arg	Leu	Ala	Ser	Phe
	610					615					620				
Ser	Gln	Pro	Leu	Cys	Cys	Ala	Val	Gln	Ile	Val	Leu	Val	Arg	Leu	Leu
625					630					635					640

Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
645 650 655

Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
660 665 670

Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
675 680 685

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
690 695 700

Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
705 710 715 720

Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
725 730 735

Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
740 745 750

Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
755 760 765

His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys
770 775 780

Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala
785 790 795 800

Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala
805 810 815

Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val
820 825 830

Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile
835 840 845

Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp
850 855 860

Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn
865 870 875 880

Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu
885 890 895

Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val
900 905 910

Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr
915 920 925

Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg
930 935 940

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser
945 950 955 960

Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro
965 970 975

Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val
980 985 990

Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys
995 1000 1005

Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu
1010 1015 1020

Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr
1025 1030 1035

Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp

1040		1045		1050
Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu				
1055		1060		1065
Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val				
1070		1075		1080
Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro				
1085		1090		1095
Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe				
1100		1105		1110
Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp				
1115		1120		1125
Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser				
1130		1135		1140
Gly Thr Leu Ala Phe Leu Pro Leu Lys Asp Glu Leu Arg Asn Glu				
1145		1150		1155
Pro Leu Leu Leu His Pro Ala Pro Leu Asp Ile Ala Phe Gln Thr				
1160		1165		1170
Val Ile Gly Ala Tyr Ser Ser Pro Gly Asp Arg Arg Leu Arg Ser				
1175		1180		1185
Leu Tyr Val Pro Thr His Val Asp Arg Val Thr Leu Ile Pro Ser				
1190		1195		1200
Leu Cys Ile Ser Ala Gly Asn Ser Gly Glu Thr Glu Leu Ala Phe				
1205		1210		1215
Asp Thr Ile Asn Thr His Asp Lys Gly Asp Phe Leu Ser Gly Asp				
1220		1225		1230

Ile Thr Val Tyr Asp Ser Thr Lys Thr Thr Leu Phe Gln Val Asp
 1235 1240 1245

Asn Ile Val Phe Lys Pro Phe Ser Pro Pro Thr Ala Ser Thr Asp
 1250 1255 1260

His Arg Ile Phe Ala Lys Trp Val Trp Gly Pro Leu Thr Pro Glu
 1265 1270 1275

Lys Leu Leu Glu Asp Pro Ala Thr Leu Ile Ile Ala Arg Asp Lys
 1280 1285 1290

Glu Asp Ile Leu Thr Ile Glu Arg Ile Val Tyr Phe Tyr Ile Lys
 1295 1300 1305

Ser Phe Leu Ala Gln Ile Thr Pro Asp Asp Arg Gln Asn Ala Asp
 1310 1315 1320

Leu His Ser Gln Lys Tyr Ile Glu Trp Cys Asp Gln Val Gln Ala
 1325 1330 1335

Asp Ala Arg Ala Gly His His Gln Trp Tyr Gln Glu Ser Trp Glu
 1340 1345 1350

Glu Asp Thr Ser Val His Ile Glu Gln Met Cys Glu Ser Asn Ser
 1355 1360 1365

Ser His Pro His Val Arg Leu Ile Gln Arg Val Gly Lys Glu Leu
 1370 1375 1380

Ile Ser Ile Val Arg Gly Asn Gly Asp Pro Leu Asp Ile Met Asn
 1385 1390 1395

Arg Asp Gly Leu Phe Thr Glu Tyr Tyr Thr Asn Lys Leu Ala Phe
 1400 1405 1410

Gly Ser Ala Ile His Val Val Gln Asp Leu Val Ser Gln Ile Ala
 1415 1420 1425

His Arg Tyr Gln Ser Ile Asp Ile Leu Glu Ile Gly Leu Gly Thr
 1430 1435 1440

Gly Ile Ala Thr Lys Arg Val Leu Ala Ser Pro Gln Leu Gly Phe
 1445 1450 1455

Asn Ser Tyr Thr Cys Thr Asp Ile Ser Ala Asp Val Ile Gly Lys
 1460 1465 1470

Ala Arg Glu Gln Leu Ser Glu Phe Asp Gly Leu Met Gln Phe Glu
 1475 1480 1485

Ala Leu Asp Ile Asn Arg Ser Pro Ala Glu Gln Gly Phe Lys Pro
 1490 1495 1500

His Ser Tyr Asp Leu Ile Ile Ala Ser Asp Val Leu His Ala Ser
 1505 1510 1515

Ser Asn Phe Glu Glu Lys Leu Ala His Ile Arg Ser Leu Leu Lys
 1520 1525 1530

Pro Gly Gly His Leu Val Thr Phe Gly Val Thr His Arg Glu Pro
 1535 1540 1545

Ala Arg Leu Ala Phe Ile Ser Gly Leu Phe Ala Asp Arg Trp Thr
 1550 1555 1560

Gly Glu Asp Glu Thr Arg Ala Leu Ser Ala Ser Gly Ser Val Asp
 1565 1570 1575

Gln Trp Glu His Thr Leu Lys Arg Val Gly Phe Ser Gly Val Asp
 1580 1585 1590

Ser Arg Thr Leu Asp Arg Glu Asp Asp Leu Ile Pro Ser Val Phe
 1595 1600 1605

Ser Thr His Ala Val Asp Ala Thr Val Glu Arg Leu Tyr Asp Pro

1610		1615		1620
Leu Ser Ala Pro Leu Lys Asp Ser Tyr Pro Pro Leu Val Val Ile				
1625		1630		1635
Gly Gly Glu Ser Thr Lys Thr Glu Arg Ile Leu Asn Asp Met Lys				
1640		1645		1650
Ala Ala Leu Pro His Arg His Ile His Ser Val Lys Arg Leu Glu				
1655		1660		1665
Ser Val Leu Asp Asp Pro Ala Leu Gln Pro Lys Ser Thr Phe Val				
1670		1675		1680
Ile Leu Ser Glu Leu Asp Asp Glu Val Phe Cys Asn Leu Glu Glu				
1685		1690		1695
Asp Lys Phe Glu Ala Val Lys Ser Leu Leu Phe Tyr Ala Gly Arg				
1700		1705		1710
Met Met Trp Leu Thr Glu Asn Ala Trp Ile Asp His Pro His Gln				
1715		1720		1725
Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro				
1730		1735		1740
Asp Leu Gly Thr His Val Phe Asp Val Asp Thr Val Glu Asn Leu				
1745		1750		1755
Asp Thr Lys Phe Phe Val Glu Gln Leu Leu Arg Phe Glu Glu Ser				
1760		1765		1770
Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu				
1775		1780		1785
Val Tyr Trp Cys Lys Gly Arg Ala Trp Val Pro Arg Leu Lys Gln				
1790		1795		1800

Asp Ile Ala Arg Asn Asp Arg Met Asn Ser Ser Arg Arg Pro Ile
 1805 1810 1815

Phe Gly Asn Phe Asn Ser Ser Lys Thr Ala Ile Ala Leu Lys Glu
 1820 1825 1830

Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu
 1835 1840 1845

Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr
 1850 1855 1860

Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His
 1865 1870 1875

Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr
 1880 1885 1890

Cys Glu Val Pro Val Val Ala Leu Ala Glu Lys Asn Gly Ser Ile
 1895 1900 1905

Leu His Val Pro Arg Asn Tyr Met His Ser Leu Pro Asp Asn Met
 1910 1915 1920

Ala Glu Gly Glu Asp Ser Ser Phe Leu Leu Ser Thr Ala Ala Ala
 1925 1930 1935

Leu Leu Ala Glu Thr Ile Leu Ser Ser Ala Gln Ser Phe Gly Ser
 1940 1945 1950

Asp Ala Ser Ile Leu Ile Met Glu Pro Pro Ile Phe Cys Val Lys
 1955 1960 1965

Ala Ile Leu Glu Ser Ala Lys Thr Tyr Gly Val Gln Val His Leu
 1970 1975 1980

Ala Thr Thr Leu Ser Asp Val Lys Thr Ile Pro Ala Pro Trp Ile
 1985 1990 1995

Arg Leu His Ala Lys Glu Thr Asp Ala Arg Leu Lys His Ser Leu
2000 2005 2010

Pro Thr Asn Met Met Ala Phe Phe Asp Leu Ser Thr Asp Arg Thr
2015 2020 2025

Ala Ala Gly Ile Thr Asn Arg Leu Ala Lys Leu Leu Pro Pro Ser
2030 2035 2040

Cys Phe Met Tyr Ser Gly Asp Tyr Leu Ile Arg Ser Thr Ala Ser
2045 2050 2055

Thr Tyr Lys Val Ser His Val Glu Asp Ile Pro Ile Leu Glu His
2060 2065 2070

Ser Val Ala Met Ala Lys Asn Thr Val Ser Ala Ser Thr Val Asp
2075 2080 2085

Asp Thr Glu Lys Val Ile Thr Ala Thr Gln Ile Leu Leu Pro Gly
2090 2095 2100

Gln, Leu Ser Val Asn His Asn Asp Gln Arg Phe Asn Leu Ala Thr
2105 2110 2115

Val Ile Asp Trp Lys Glu Asn Glu Val Ser Ala Arg Ile Cys Pro
2120 2125 2130

Ile Asp Ser Gly Asn Leu Phe Ser Asn Lys Lys Thr Tyr Leu Leu
2135 2140 2145

Val Gly Leu Thr Gly Asp Leu Gly Arg Ser Leu Cys Arg Trp Met
2150 2155 2160

Ile Leu His Gly Ala Arg His Val Val Leu Thr Ser Arg Asn Pro
2165 2170 2175

Arg Leu Asp Pro Lys Trp Ile Ala Asn Met Glu Ala Leu Gly Gly

2180		2185		2190
Asp Ile Thr Val Leu Ser Met	Asp Val Ala Asn Glu	Asp Ser Val		
2195	2200	2205		
Asp Ala Gly Leu Gly Lys Leu	Val Asp Met Lys Leu	Pro Pro Val		
2210	2215	2220		
Ala Gly Ile Ala Phe Gly Pro	Leu Val Leu Gln Asp	Val Met Leu		
2225	2230	2235		
Lys Asn Met Asp His Gln Met	Met Asp Met Val Leu	Lys Pro Lys		
2240	2245	2250		
Val Gln Gly Ala Arg Ile Leu	His Glu Arg Phe Ser	Glu Gln Thr		
2255	2260	2265		
Gly Ser Lys Ala Leu Asp Phe	Phe Ile Met Phe Ser	Ser Ile Val		
2270	2275	2280		
Ala Val Ile Gly Asn Pro Gly	Gln Ser Asn Tyr Gly	Ala Ala Asn		
2285	2290	2295		
Ala Tyr Leu Gln Ala Leu Ala	Gln Gln Arg Cys Ala	Arg Gly Leu		
2300	2305	2310		
Ala Gly Ser Thr Ile Asp Ile	Gly Ala Val Tyr Gly	Val Gly Phe		
2315	2320	2325		
Val Thr Arg Ala Glu Met Glu	Glu Asp Phe Asp Ala	Ile Arg Phe		
2330	2335	2340		
Met Phe Asp Ser Val Glu Glu	His Glu Leu His Thr	Leu Phe Ala		
2345	2350	2355		
Glu Ala Val Val Ser Asp Gln	Arg Ala Arg Gln Gln	Pro Gln Arg		
2360	2365	2370		

Lys	Thr	Val	Ile	Asp	Met	Ala	Asp	Leu	Glu	Leu	Thr	Thr	Gly	Ile
2375						2380					2385			
Pro	Asp	Leu	Asp	Pro	Ala	Leu	Gln	Asp	Arg	Ile	Ile	Tyr	Phe	Asn
2390						2395					2400			
Asp	Pro	Arg	Phe	Gly	Asn	Phe	Lys	Ile	Pro	Gly	Gln	Arg	Gly	Asp
2405						2410					2415			
Gly	Gly	Asp	Asn	Gly	Ser	Gly	Ser	Lys	Gly	Ser	Ile	Ala	Asp	Gln
2420						2425					2430			
Leu	Lys	Gln	Ala	Thr	Thr	Leu	Asp	Gln	Val	Arg	Gln	Ile	Val	Ile
2435						2440					2445			
Asp	Gly	Leu	Ser	Glu	Lys	Leu	Arg	Val	Thr	Leu	Gln	Val	Ser	Asp
2450						2455					2460			
Gly	Glu	Ser	Val	Asp	Pro	Thr	Ile	Pro	Leu	Ile	Asp	Gln	Gly	Val
2465						2470					2475			
Asp	Ser	Leu	Gly	Ala	Val	Thr	Val	Gly	Ser	Trp	Phe	Ser	Lys	Gln
2480						2485					2490			
Leu	Tyr	Leu	Asp	Leu	Pro	Leu	Leu	Arg	Val	Leu	Gly	Gly	Ala	Ser
2495						2500					2505			
Val	Ala	Asp	Leu	Ala	Asp	Asp	Ala	Ala	Thr	Arg	Leu	Pro	Ala	Thr
2510						2515					2520			
Ser	Ile	Pro	Leu	Leu	Leu	Gln	Ile	Gly	Asp	Ser	Thr	Gly	Thr	Ser
2525						2530					2535			
Asp	Ser	Gly	Ala	Ser	Pro	Thr	Pro	Thr	Asp	Ser	His	Asp	Glu	Ala
2540						2545					2550			
Ser	Ser	Ala	Thr	Ser	Thr	Asp	Ala	Ser	Ser	Ala	Glu	Glu	Asp	Glu
2555						2560					2565			

Glu Gln Glu Asp Asp Asn Glu Gln Gly Gly Arg Lys Ile Leu Arg
 2570 2575 2580

Arg Glu Arg Leu Ser Leu Gly Gln Glu Tyr Ser Trp Arg Gln Gln
 2585 2590 2595

Gln Met Val Lys Asp His Thr Ile Phe Asn Asn Thr Ile Gly Met
 2600 2605 2610

Phe Met Lys Gly Thr Ile Asp Leu Asp Arg Leu Arg Arg Ala Leu
 2615 2620 2625

Lys Ala Ser Leu Arg Arg His Glu Ile Phe Arg Thr Cys Phe Val
 2630 2635 2640

Thr Gly Asp Asp Tyr Ser Ser Asp Leu Asn Gly Pro Val Gln Val
 2645 2650 2655

Val Leu Lys Asn Pro Glu Asn Arg Val His Phe Val Gln Val Asn
 2660 2665 2670

Asn Ala Ala Glu Ala Glu Glu Glu Tyr Arg Lys Leu Glu Lys Thr
 2675 2680 2685

Asn Tyr Ser Ile Ser Thr Gly Asp Thr Leu Arg Leu Val Asp Phe
 2690 2695 2700

Tyr Trp Gly Thr Asp Asp His Leu Leu Val Ile Gly Tyr His Arg
 2705 2710 2715

Leu Val Gly Asp Gly Ser Thr Thr Glu Asn Leu Phe Asn Glu Ile
 2720 2725 2730

Gly Gln Ile Tyr Ser Gly Val Lys Met Gln Arg Pro Ser Thr Gln
 2735 2740 2745

Phe Ser Asp Leu Ala Val Gln Gln Arg Glu Asn Leu Glu Asn Gly

2750		2755		2760
Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys				
2765		2770		2775
Val Ser Ser Ser Ala Pro Thr Val Leu Pro Ile Met Asn Leu Ile				
2780		2785		2790
Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Gln Ile Gln Pro Phe				
2795		2800		2805
Thr Trp Gln Gln Tyr Glu Ala Ile Ala Arg Leu Asp Pro Met Val				
2810		2815		2820
Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro				
2825		2830		2835
Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu				
2840		2845		2850
Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg				
2855		2860		2865
Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val				
2870		2875		2880
Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly				
2885		2890		2895
Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln				
2900		2905		2910
His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu				
2915		2920		2925
Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala				
2930		2935		2940

Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu
 2945 2950 2955

Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser
 2960 2965 2970

Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp
 2975 2980 2985

Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu
 2990 2995 3000

Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser
 3005 3010 3015

Ile Leu Thr Met Phe Ser Met Asn Pro Ala Leu Lys Leu Ala
 3020 3025 3030

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<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(7692)

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 48

Met Asn Asn Thr Pro Ala Val Thr Ala Thr Ala Thr Ala Thr

1

5

10

15

gca acc gca atg gca ggc tcg gct tgc tct aac aca tcc acg ccc att

96

Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile

20

25

30

gcc ata gtt gga atg gga tgt cga ttt gct gga gat gca acg agt cca

144

Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro

35

40

45

cag aag ctt tgg gaa atg gtt gaa aga gga ggc agt gcc tgg tct aag

192

Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys

50

55

60

gtc ccc tcc tcg cga ttc aat gtg aga gga gta tac cac ccg aat ggc

240

Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly

65

70

75

80

gaa agg gtc ggg tcc acc cac gta aag ggt gga cac ttc atc gac gag

288

Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu

85

90

95

gat cct gct tta ttt gac gcc gcg ttc ttc aac atg acc aca gag gtc

336

Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val

100

105

110

gcc agc tgc atg gat ccg cag tat cgg ctt atg ctt gag gtg gtc tac

384

Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr

115

120

125

gaa tcg ctg gag agt gcc ggt atc acc atc gat ggt atg gca ggc tct

432

Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser

130

135

140

aat acg tcg gtg ttt ggg ggt gtc atg tac cac gac tat cag gat tcg

480

Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser

145

150

155

160

ctc aat cgt gac ccc gag aca gtt ccg cgt tat ttc ata act ggc aac

528

Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn

165

170

175

tca gga aca atg ctt tcg aac cgg ata tca cac ttc tac gac tta cgt

576

Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg

180

185

190

ggt ccc agc gtg acg gtt gac acg gcc tgt tcg acg aca ttg acc gca

624

Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala

195

200

205

ctg cac ttg gcg tgc cag agc tta cgt act ggg gag tca gat aca gcc

672

Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala

210

215

220

atc gtt atc ggt gca aat ctt ctg ctc aat ccc gat gtt ttt gtt acg

720

Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr

225

230

235

240

atg tca aac ctg gga ttt ttg tcc ccg gat ggt atc tcg tac tct ttt

768

Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe

245

250

255

gat cct cga gcg aat gga tat ggt cgc ggg gaa gga att gcc gct ctg

816

Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu

260

265

270

gta ata aag gcc ctc cct aac gcg ttg cga gac caa gac cct atc cga

864

Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg

275

280

285

gcc gtc att cga gag aca gcg ctg aac cag gat ggc aaa aca ccc gca

912

Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala

290

295

300

att act gcg ccg agt gat gtg gcg cag aaa agt ctg atc cag gag tgt

960

Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys

305

310

315

320

tac gat aag gct ggg cta gat atg tcg ttg acc tcg tac gtg gag gcc

1008

Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala

325

330

335

cac gga act gga aca cca act ggt gac ccc ctt gaa atc tca gca att

1056

His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile

340

345

350

tca gca gct ttt aaa gga cat cct ctg cac ctt ggc tct gtg aaa gca

1104

Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala

355	360	365	
aat att ggc cat aca gaa gcc gcc agt ggc ctg gcc agt ata atc aag			
1152			
Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys			
370	375	380	
gtg gcc ttg gcc ttg gag aag ggc ttg att ccc cct aat gcg cgg ttc			
1200			
Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe			
385	390	395	400
ctg caa aag aac agc aag ctg atg ctt gac caa aag aac atc aag atc			
1248			
Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile			
405	410	415	
ccc atg tct gct caa gac tgg cct gtg aaa gat ggg act cgt cgc gca			
1296			
Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala			
420	425	430	
tct gtc aat aac ttc ggc ttt ggt ggt tcg aat gct cac gtc att ttg			
1344			
Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu			
435	440	445	
gaa tca tat gat cgc gca tca ttg gcc ctg cca gag gat caa gtg cat			
1392			
Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His			
450	455	460	
gtc aat ggt aac tct gag cat ggt agg gtt gag gat ggt tcc aaa cag			
1440			
Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln			

465	470	475	480
agc cgc ata tac gtt gtg cgt gcc aag gac gag caa gct tgt cgg cga			
1488			
Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg			
	485	490	495
acg ata gca agc ctg cga gac tac att aaa tcc gtc gct gac att gac			
1536			
Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp			
	500	505	510
ggg gaa ccc ttc ctc gcc agc ctc gcc tat aca cta ggc tct cgc cgt			
1584			
Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg			
	515	520	525
tcc att ctg cca tgg acg tca gtg tat gta gca gac agc ctt ggc ggc			
1632			
Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly			
	530	535	540
ctt gtt tct gcc ctc agc gat gag tcc aat caa cca aaa cga gcg aat			
1680			
Leu Val Ser Ala Leu Ser Asp Glu Ser Asn Gln Pro Lys Arg Ala Asn			
545	550	555	560
gag aaa gta cgg ctc gga ttt gta ttc acc ggt cag ggg gcg cag tgg			
1728			
Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp			
	565	570	575
cat gca atg ggc aga gag ctg gtc aat aca ttc cca gta ttc aaa cag			
1776			
His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln			
	580	585	590

gcg att ctt gaa tgt gat ggc tac atc aag caa ctg ggc gcg agt tgg
1824

Ala Ile Leu Glu Cys Asp Gly Tyr Ile Lys Gln Leu Gly Ala Ser Trp

595

600

605

aat ttt atg gag gag ctc cac cgt gat gag ctg acg act cgg gta aat
1872

Asn Phe Met Glu Glu Leu His Arg Asp Glu Leu Thr Thr Arg Val Asn

610

615

620

gat gcc gaa tac agt cta cca ctg tca acc gct atc caa att gca ctt
1920

Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu

625

630

635

640

gtg cgt ctc ctt tgg tca tgg gga att cgg cca acg ggg ata acc agt
1968

Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser

645

650

655

cac tca agt gga gag gct gct gct gcc tac gca gct ggg gct tta tcc
2016

His Ser Ser Gly Glu Ala Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser

660

665

670

gcg cgg tcg gcc att ggg atc act tat ata cgc ggt gta ttg acc act
2064

Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr

675

680

685

aag ccc aag ccc gca ttg gca gcc aaa gga gga atg atg gcg gtg ggt
2112

Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly

690

695

700

ctt ggt cgc agt gag acc aat gtt tac att tcg cgt ctc aac cag gag
2160

Leu Gly Arg Ser Glu Thr Asn Val Tyr Ile Ser Arg Leu Asn Gln Glu

705

710

715

720

gac ggc tgt gtg gtg gtt gga tgt atc aac agt caa tgt agt gtg acg
2208

Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr

725

730

735

gtg tcg gga gat ttg ggt gca atc gag aaa ctt gaa aag ttg tta cac
2256

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His

740

745

750

gcc gat ggc atc ttt acc agg aaa ctg aaa gtc act gaa gcc ttc cat
2304

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His

755

760

765

tca agc cac atg cga cca atg gca gat gcc ttt ggg gcg tca ctg aga
2352

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg

770

775

780

gat ctg ttc aac tcg gat aac aac aac gac aat ccc aat gct gac acc
2400

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr

785

790

795

800

tca aag ggt gta tta tat tca tca cct aag act ggt agt cgc atg acc
2448

Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr

805

810

815

gat ctt aaa ttg cta ttg gat ccc aca cac tgg atg gat agt atg cta

2496

Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu

820

825

830

cag ccg gta gag ttc gag tcc tca ctc cgc gag atg tgc ttt gat ccc

2544

Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro

835

840

845

aac acc aaa gag aaa gcc gtc gat gtg att att gaa ata ggg cct cac

2592

Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His

850

855

860

gga gcg ctt ggt ggt cca atc aac caa gtc atg cag gat ctg ggt ctg

2640

Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu

865

870

875

880

aaa gga aca gat ata aac tat ctc agt tgc ctt tct cgc ggc aga agc

2688

Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser

885

890

895

tcg ttg gag aca atg tat cgt gct gct acg gag ttg ata agc aag ggt

2736

Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly

900

905

910

tat ggg ctc aaa atg gac gct ata aac ttt cct cat gga aga aaa gag

2784

Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu

915

920

925

ccc aga gtg aag gta ctg agc gat ttg ccg gcg tac ccg tgg aat cac

2832

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
 930 935 940

caa acc cgt tat tgg aga gag cct cgc ggc agt cgt gag tcc aaa cag
 2880
 Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
 945 950 955 960

aga acc cat ccg cct cac act ttg ata ggc tca cgg gaa tct ctc tct
 2928
 Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
 965 970 975

cct cat ttc gcg cct aaa tgg aaa cat gtt ctc cgt ctg tca gat att
 2976
 Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
 980 985 990

cca tgg ata cga gat cac gtc gtt ggt tcg agc atc atc ttt ccg gga
 3024
 Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
 995 1000 1005

gct ggc ttc atc agc atg gcc atc gag ggg ttt tca caa gtc tgc
 3069
 Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
 1010 1015 1020

cca cca gtt gcg ggg gct agc atc aac tac aac ttg cgt gac gtt
 3114
 Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
 1025 1030 1035

gaa ctc gcg cag gct ctc ata ata ccc gct gat gca gaa gca gag
 3159
 Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu

1040	1045	1050
gtt gac 3204	ctg cgc cta acg atc	cgt tca tgt gag gaa agg tcc ctc
Val Asp	Leu Arg Leu Thr Ile	Arg Ser Cys Glu Glu Arg Ser Leu
1055	1060	1065
ggc aca 3249	aag aac tgg cat caa	ttt tct gtg cac tca att tcg ggc
Gly Thr	Lys Asn Trp His Gln	Phe Ser Val His Ser Ile Ser Gly
1070	1075	1080
gaa aat 3294	aat acc tgg aca gaa	cac tgc acc gga tta ata cgt tcg
Glu Asn	Asn Thr Trp Thr Glu	His Cys Thr Gly Leu Ile Arg Ser
1085	1090	1095
gag agc 3339	gaa aga agc cac ctt	gac tgt tca act gtg gaa gcc tca
Glu Ser	Glu Arg Ser His Leu	Asp Cys Ser Thr Val Glu Ala Ser
1100	1105	1110
cgc agg 3384	ttg aat cta ggc tca	gat aac cgg agc att gat ccc aac
Arg Arg	Leu Asn Leu Gly Ser	Asp Asn Arg Ser Ile Asp Pro Asn
1115	1120	1125
gat ctc 3429	tgg gag tcc tta cac	gcg aat ggg ata tgc cac gga ccc
Asp Leu	Trp Glu Ser Leu His	Ala Asn Gly Ile Cys His Gly Pro
1130	1135	1140
att ttt 3474	cag aac att cag cga	att caa aac aat gga cag ggc tcg
Ile Phe	Gln Asn Ile Gln Arg	Ile Gln Asn Asn Gly Gln Gly Ser

1145	1150	1155
ttt tgc aga ttt tcc att gct gac act gcc tcg gct atg cct cac 3519		
Phe Cys Arg Phe Ser Ile Ala Asp Thr Ala Ser Ala Met Pro His		
1160	1165	1170
tcg tac gag aat cga cac atc gtc cat cct act act ctg gac tcg 3564		
Ser Tyr Glu Asn Arg His Ile Val His Pro Thr Thr Leu Asp Ser		
1175	1180	1185
gtg atc cag gcg gca tac acg gtg tta ccc tac gcg gga aca cgt 3609		
Val Ile Gln Ala Ala Tyr Thr Val Leu Pro Tyr Ala Gly Thr Arg		
1190	1195	1200
atg aaa acg gcc atg gta cca agg agg cta aga aat gtc aaa ata 3654		
Met Lys Thr Ala Met Val Pro Arg Arg Leu Arg Asn Val Lys Ile		
1205	1210	1215
tcc tct agc ctg gct gac ttg gag gct ggt gat gct ctg gac gca 3699		
Ser Ser Ser Leu Ala Asp Leu Glu Ala Gly Asp Ala Leu Asp Ala		
1220	1225	1230
cag gcc agc atc aag gat cgc aac tct caa tcc ttc tct acc gac 3744		
Gln Ala Ser Ile Lys Asp Arg Asn Ser Gln Ser Phe Ser Thr Asp		
1235	1240	1245
ttg gca gtg ttt gat gac tat gat agc ggt tct tct ccc tcg gac 3789		
Leu Ala Val Phe Asp Asp Tyr Asp Ser Gly Ser Ser Pro Ser Asp		
1250	1255	1260

gga atc cca gtc ata gag att gaa ggc ctt gtt ttc cag tcg gtt
3834

Gly Ile Pro Val Ile Glu Ile Glu Gly Leu Val Phe Gln Ser Val

1265

1270

1275

gga agc agc ttc tct gac caa aag tca gac tcc aac gac aca gaa
3879

Gly Ser Ser Phe Ser Asp Gln Lys Ser Asp Ser Asn Asp Thr Glu

1280

1285

1290

aat gcc tgc agc tcc tgg gtt tgg gcc cct gac atc agc ttg ggt
3924

Asn Ala Cys Ser Ser Trp Val Trp Ala Pro Asp Ile Ser Leu Gly

1295

1300

1305

gac tcc act tgg ctc aaa gaa aag ttg agc act gag gct gag acg
3969

Asp Ser Thr Trp Leu Lys Glu Lys Leu Ser Thr Glu Ala Glu Thr

1310

1315

1320

aaa gaa acg gaa ctc atg atg gac ctc cga aga tgc acg atc aac
4014

Lys Glu Thr Glu Leu Met Met Asp Leu Arg Arg Cys Thr Ile Asn

1325

1330

1335

ttt ata cag gag gct gtc act gat ttg aca aat tct gat atc caa
4059

Phe Ile Gln Glu Ala Val Thr Asp Leu Thr Asn Ser Asp Ile Gln

1340

1345

1350

cat ctg gat ggc cac ctt cag aag tat ttc gat tgg atg aat gtc
4104

His Leu Asp Gly His Leu Gln Lys Tyr Phe Asp Trp Met Asn Val

1355

1360

1365

caa ttg gac ctt gcg aga caa aac aag ctc agc cca gcc agt tgc
4149

Gln Leu Asp Leu Ala Arg Gln Asn Lys Leu Ser Pro Ala Ser Cys

1370

1375

1380

gac tgg cta agt gac gat gct gag cag aag aaa tgc cta cag gcc
4194

Asp Trp Leu Ser Asp Asp Ala Glu Gln Lys Lys Cys Leu Gln Ala

1385

1390

1395

aga gtc gct gga gaa agc gtc aat ggc gag atg att tct cgt cta
4239

Arg Val Ala Gly Glu Ser Val Asn Gly Glu Met Ile Ser Arg Leu

1400

1405

1410

gga cct cag tta ata gca atg cta cgc cgc gaa aca gag cca ctt
4284

Gly Pro Gln Leu Ile Ala Met Leu Arg Arg Glu Thr Glu Pro Leu

1415

1420

1425

gag ttg atg atg caa gat cag ctg cta agc aga tac tac gtc aac
4329

Glu Leu Met Met Gln Asp Gln Leu Leu Ser Arg Tyr Tyr Val Asn

1430

1435

1440

gca atc aaa tgg agc cga tca aac gca caa gcc agc gag ctg atc
4374

Ala Ile Lys Trp Ser Arg Ser Asn Ala Gln Ala Ser Glu Leu Ile

1445

1450

1455

cga ctt tgc gcc cac aag aac ccg cgt tct cgc att ttg gag att
4419

Arg Leu Cys Ala His Lys Asn Pro Arg Ser Arg Ile Leu Glu Ile

1460

1465

1470

ggc gga ggc acg ggc ggc tgc aca aag ctt att gtc aat gca ttg

4464
 Gly Gly Gly Thr Gly Gly Cys Thr Lys Leu Ile Val Asn Ala Leu
 1475 1480 1485

gga aac acc aag ccg atc gat cgt tat gac ttc acc gat gtg tct
 4509
 Gly Asn Thr Lys Pro Ile Asp Arg Tyr Asp Phe Thr Asp Val Ser
 1490 1495 1500

gcc ggg ttt ttc gag tcg gcg cgt gag caa ttt gcg gat tgg caa
 4554
 Ala Gly Phe Phe Glu Ser Ala Arg Glu Gln Phe Ala Asp Trp Gln
 1505 1510 1515

gac gtg atg act ttc aaa aaa ttg gat att gaa agc gat ccc gag
 4599
 Asp Val Met Thr Phe Lys Lys Leu Asp Ile Glu Ser Asp Pro Glu
 1520 1525 1530

caa caa ggg ttt gaa tgt gcc acc tac gat gtg gtc gtg gct tgc
 4644
 Gln Gln Gly Phe Glu Cys Ala Thr Tyr Asp Val Val Val Ala Cys
 1535 1540 1545

cag gtc ctg cat gca act cga tgc atg aaa cga aca ctg agt aac
 4689
 Gln Val Leu His Ala Thr Arg Cys Met Lys Arg Thr Leu Ser Asn
 1550 1555 1560

gtt cga aaa ttg ctc aag cct ggg ggc aac ttg att ttg gtt gag
 4734
 Val Arg Lys Leu Leu Lys Pro Gly Gly Asn Leu Ile Leu Val Glu
 1565 1570 1575

act acc agg gat cag ctc gat ttg ttc ttt acc ttc gga ctg ttg
 4779

Thr Thr Arg Asp Gln Leu Asp Leu Phe Phe Thr Phe Gly Leu Leu
 1580 1585 1590

cca ggt tgg tgg ctc agt gag gag cct gag cgg aag tcg acg cca
 4824
 Pro Gly Trp Trp Leu Ser Glu Glu Pro Glu Arg Lys Ser Thr Pro
 1595 1600 1605

tcg ctc act acc gat ctt tgg aac acc atg ttg gac acg agc ggt
 4869
 Ser Leu Thr Thr Asp Leu Trp Asn Thr Met Leu Asp Thr Ser Gly
 1610 1615 1620

ttc aac ggt gtg gaa ttg gag gtt cgt gat tgt gaa gac gat gag
 4914
 Phe Asn Gly Val Glu Leu Glu Val Arg Asp Cys Glu Asp Asp Glu
 1625 1630 1635

ttt tac atg atc agc aca atg cta tcg acg gct aga aaa gag aat
 4959
 Phe Tyr Met Ile Ser Thr Met Leu Ser Thr Ala Arg Lys Glu Asn
 1640 1645 1650

aca acc ccg gat aca gtg gca gaa tcg gag gtg ctt ttg ctg cac
 5004
 Thr Thr Pro Asp Thr Val Ala Glu Ser Glu Val Leu Leu Leu His
 1655 1660 1665

gga gcg ctc cga cct cct tca tct tgg ctg gaa agt ctc cag gca
 5049
 Gly Ala Leu Arg Pro Pro Ser Ser Trp Leu Glu Ser Leu Gln Ala
 1670 1675 1680

gca att tgt gaa aag acc agt tct agc cca tcg atc aac gct ctg
 5094
 Ala Ile Cys Glu Lys Thr Ser Ser Ser Pro Ser Ile Asn Ala Leu

1685	1690	1695
ggc gag 5139	gta gat acc act gga	agg aca tgc att ttt ctt ggg gaa
Gly Glu	Val Asp Thr Thr Gly	Arg Thr Cys Ile Phe Leu Gly Glu
1700	1705	1710
atg gag 5184	tcc tcg ctc ctt gga	gag gtg gga agc gag acc ttc aaa
Met Glu	Ser Ser Leu Leu Gly	Glu Val Gly Ser Glu Thr Phe Lys
1715	1720	1725
tcc atc 5229	acc gcg atg ctg aat	aac tgc aac gca ctt ctc tgg gtg
Ser Ile	Thr Ala Met Leu Asn	Asn Cys Asn Ala Leu Leu Trp Val
1730	1735	1740
tct aga 5274	gga gca gcc atg agc	tcc gag gat cca tgg aaa gct cta
Ser Arg	Gly Ala Ala Met Ser	Ser Glu Asp Pro Trp Lys Ala Leu
1745	1750	1755
cat att 5319	ggc ctg ctg cgt acc	atc cgc aac gaa aat aac ggg aag
His Ile	Gly Leu Leu Arg Thr	Ile Arg Asn Glu Asn Asn Gly Lys
1760	1765	1770
gaa tat 5364	gta tcg ttg gat ctc	gat cct tct cga aac gca tac acc
Glu Tyr	Val Ser Leu Asp Leu	Asp Pro Ser Arg Asn Ala Tyr Thr
1775	1780	1785
cac gag 5409	tcc ctg tat gct atc	tgc aat atc ttc aat ggc cgc ctc
His Glu	Ser Leu Tyr Ala Ile	Cys Asn Ile Phe Asn Gly Arg Leu

1790	1795	1800
ggc gac 5454	ctt tcc gaa gac aag	gag ttt gaa ttt gca gag aga aac
Gly Asp	Leu Ser Glu Asp Lys	Glu Phe Glu Phe Ala Glu Arg Asn
1805	1810	1815
ggc gtc 5499	atc cac gta ccg cga	ctt ttc aat gac ccg cac tgg aag
Gly Val	Ile His Val Pro Arg	Leu Phe Asn Asp Pro His Trp Lys
1820	1825	1830
gac caa 5544	gaa gcg gtt gag gtc	aca ctg cag ccg ttc gag caa ccc
Asp Gln	Glu Ala Val Glu Val	Thr Leu Gln Pro Phe Glu Gln Pro
1835	1840	1845
ggg cgt 5589	cgt ctg cgg atg gag	gtt gag acg cca ggg ctc tta gac
Gly Arg	Arg Leu Arg Met Glu	Val Glu Thr Pro Gly Leu Leu Asp
1850	1855	1860
tcc ctg 5634	caa ttt cga gac gac	gaa gga cgt gaa ggc aag gat ctt
Ser Leu	Gln Phe Arg Asp Asp	Glu Gly Arg Glu Gly Lys Asp Leu
1865	1870	1875
ccg gat 5679	gat tgg gta gaa atc	gaa ccc aaa gct ttc ggt ctc aat
Pro Asp	Asp Trp Val Glu Ile	Glu Pro Lys Ala Phe Gly Leu Asn
1880	1885	1890
ttt cgg 5724	gat gtc atg gtt gcc	atg ggt caa ttg gag gcc aac cgt
Phe Arg	Asp Val Met Val Ala	Met Gly Gln Leu Glu Ala Asn Arg
1895	1900	1905

gtg atg ggc ttc gaa tgc gcc gga gtg atc aca aag ctc ggt gga
5769

Val Met Gly Phe Glu Cys Ala Gly Val Ile Thr Lys Leu Gly Gly

1910

1915

1920

gct gct gcc gct agc caa ggc ctc aga tta ggg gac cgc gta tgt
5814

Ala Ala Ala Ala Ser Gln Gly Leu Arg Leu Gly Asp Arg Val Cys

1925

1930

1935

gca cta ctg aaa ggc cat tgg gcg acc aga aca cag acg ccg tac
5859

Ala Leu Leu Lys Gly His Trp Ala Thr Arg Thr Gln Thr Pro Tyr

1940

1945

1950

act aat gtc gtc cgt att ccg gac gaa atg ggc ttc cca gaa gcc
5904

Thr Asn Val Val Arg Ile Pro Asp Glu Met Gly Phe Pro Glu Ala

1955

1960

1965

gct tcg gtc ccc ctg gct ttc act acc gca tat att gcg ctt tat
5949

Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr

1970

1975

1980

acc acg gca aag cta cga cga ggc gaa aga gtc ttg atc cac agt
5994

Thr Thr Ala Lys Leu Arg Arg Gly Glu Arg Val Leu Ile His Ser

1985

1990

1995

gga gct gga ggc gtc ggt caa gca gcg atc att ttg tcc cag ctt
6039

Gly Ala Gly Gly Val Gly Gln Ala Ala Ile Ile Leu Ser Gln Leu

2000

2005

2010

gcg ggt gcc gag gtc ttc gtc aca gcg gga act caa gcc aag cgt
6084

Ala Gly Ala Glu Val Phe Val Thr Ala Gly Thr Gln Ala Lys Arg

2015

2020

2025

gac ttt gtc ggc gat aaa ttc ggc atc aat ccg gat cat atc ttc
6129

Asp Phe Val Gly Asp Lys Phe Gly Ile Asn Pro Asp His Ile Phe

2030

2035

2040

tcg agc agg aat gac tta ttc gtc gac ggc atc aaa gcc tac acg
6174

Ser Ser Arg Asn Asp Leu Phe Val Asp Gly Ile Lys Ala Tyr Thr

2045

2050

2055

ggc gga ctt ggc gtt cat gtc gtt cta aac tca ttg gca ggt caa
6219

Gly Gly Leu Gly Val His Val Val Leu Asn Ser Leu Ala Gly Gln

2060

2065

2070

ctc ctc caa gca agc ttt gac tgc atg gcc gaa ttc ggc aga ttt
6264

Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe

2075

2080

2085

gtt gag att gga aaa aag gac ctg gag caa aac agc aga ctt gac
6309

Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp

2090

2095

2100

atg ctg cca ttc acc cgg gac gtc tct ttc aca tca att gat ctt
6354

Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu

2105

2110

2115

ctc tcg tgg caa aga gcc aaa agt gaa gaa gta tcc gaa gcg ttg

6399
 Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu
 2120 2125 2130

aac cat gtc aca aaa ctc ctc gag aca aaa gcg att ggc ttg att
 6444
 Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
 2135 2140 2145

ggt cca atc cag cag cac tcc ttg tca aac atc gag aag gcc ttc
 6489
 Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
 2150 2155 2160

cgt acg atg cag agt ggt cag cat gtt ggc aaa gtt gtg gtc aat
 6534
 Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
 2165 2170 2175

gta tct ggg gac gaa ctg gtc cca gtc ggc gat gga ggg ttc tcg
 6579
 Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
 2180 2185 2190

ctg aag ctg aag cct gac agt tct tac cta gtt gct ggt ggg ctg
 6624
 Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
 2195 2200 2205

ggg gga att gga aag cag atc tgt cag tgg ctt gtt gat cat ggc
 6669
 Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
 2210 2215 2220

gcg aag cac ttg att atc cta tcg aga agt gca aag gcc agt cca
 6714

Ala Lys	His Leu Ile Ile Leu	Ser Arg Ser Ala Lys	Ala Ser Pro
2225	2230	2235	

ttc ata	acc agc ttg caa aat	caa cag tgc gct gtc	tat cta cac
6759			
Phe Ile	Thr Ser Leu Gln Asn	Gln Gln Cys Ala Val	Tyr Leu His
2240	2245	2250	

gca tgt	gac atc tca gat caa	gat cag gtc acc aag	gtg ctc cgg
6804			
Ala Cys	Asp Ile Ser Asp Gln	Asp Gln Val Thr Lys	Val Leu Arg
2255	2260	2265	

ttg tgc	gaa gaa gca cat gca	ccg cca att cga ggt	atc ata caa
6849			
Leu Cys	Glu Glu Ala His Ala	Pro Pro Ile Arg Gly	Ile Ile Gln
2270	2275	2280	

ggt gcc	atg gtt ctc aag gac	gcg ctt cta tcg cga	atg aca ttg
6894			
Gly Ala	Met Val Leu Lys Asp	Ala Leu Leu Ser Arg	Met Thr Leu
2285	2290	2295	

gat gaa	ttt aat gca gca aca	cgc cca aaa gta cag	ggt agt tgg
6939			
Asp Glu	Phe Asn Ala Ala Thr	Arg Pro Lys Val Gln	Gly Ser Trp
2300	2305	2310	

tat ctt	cac aag atc gca cag	gat gtt gac ttc ttc	gtg atg ctc
6984			
Tyr Leu	His Lys Ile Ala Gln	Asp Val Asp Phe Phe	Val Met Leu
2315	2320	2325	

tca tcc	ctt gtt ggg gtc atg	ggt ggg gca ggc cag	gcc aat tac
7029			
Ser Ser	Leu Val Gly Val Met	Gly Gly Ala Gly Gln	Ala Asn Tyr

2330	2335	2340
gca gct 7074	gct ggt gca ttc cag	gac gca ctt gcg cac cac cgg aga
Ala Ala	Ala Gly Ala Phe Gln	Asp Ala Leu Ala His His Arg Arg
2345	2350	2355
gcc cat 7119	ggc atg ccg gct gtc	acc att gac ttg ggc atg gtc aag
Ala His	Gly Met Pro Ala Val	Thr Ile Asp Leu Gly Met Val Lys
2360	2365	2370
tct gtt 7164	gga tac gtg gct gaa	act ggc cgt ggt gtg gcc gac cgg
Ser Val	Gly Tyr Val Ala Glu	Thr Gly Arg Gly Val Ala Asp Arg
2375	2380	2385
ctc gct 7209	aga ata ggt tac aag	cct atg cat gaa aag gac gtc atg
Leu Ala	Arg Ile Gly Tyr Lys	Pro Met His Glu Lys Asp Val Met
2390	2395	2400
gat gtg 7254	ttg gag aag gca atc	ctg tgt tct tcc cct caa ttt cca
Asp Val	Leu Glu Lys Ala Ile	Leu Cys Ser Ser Pro Gln Phe Pro
2405	2410	2415
tca cct 7299	ccc gca gct gtg gtt	aca gga atc aac aca tcc ccg ggt
Ser Pro	Pro Ala Ala Val Val	Thr Gly Ile Asn Thr Ser Pro Gly
2420	2425	2430
gct cac 7344	tgg acc gag gca aac	tgg ata cag gaa cag cgg ttt gtg
Ala His	Trp Thr Glu Ala Asn	Trp Ile Gln Glu Gln Arg Phe Val

2435	2440	2445
gga ctt 7389	aaa tac cgc caa gtc	ctt cat gca gac caa tcc ttt gtc
Gly Leu	Lys Tyr Arg Gln Val	Leu His Ala Asp Gln Ser Phe Val
2450	2455	2460
tct tcg 7434	cat aaa aaa gga cca	gat ggc gtg cgg gcc caa cta agc
Ser Ser	His Lys Lys Gly Pro	Asp Gly Val Arg Ala Gln Leu Ser
2465	2470	2475
agg gtc 7479	acc tct cac gac gag	gcc att tct atc gtc ctc aaa gca
Arg Val	Thr Ser His Asp Glu	Ala Ile Ser Ile Val Leu Lys Ala
2480	2485	2490
atg acg 7524	gaa aag ctg atg cga	atg ttt ggt ctg gca gaa gac gac
Met Thr	Glu Lys Leu Met Arg	Met Phe Gly Leu Ala Glu Asp Asp
2495	2500	2505
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Met Ser	Ser Ser Lys Asn Leu	Ala Gly Val Gly Val Asp Ser Leu
2510	2515	2520
gtc gcc 7614	att gaa ctt cga aac	tgg atc aca tct gaa atc cat gtt
Val Ala	Ile Glu Leu Arg Asn	Trp Ile Thr Ser Glu Ile His Val
2525	2530	2535
gat gtg 7659	tcg atc ttt gag ctc	atg aat ggt aac acc atc gcc ggc
Asp Val	Ser Ile Phe Glu Leu	Met Asn Gly Asn Thr Ile Ala Gly
2540	2545	2550

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7692

Leu Val Glu Leu Val Val Ala Lys Cys Ser

2555

2560

<210> 46

<211> 2563

<212> PRT

<213> Penicillium citrinum

<400> 46

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20 25 30

Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro
35 40 45

Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys
50 55 60

Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly
65 70 75 80

Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu
85 90 95

Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val
100 105 110

Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr
 115 120 125

Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser
 130 135 140

Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser
 145 150 155 160

Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn
 165 170 175

Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg
 180 185 190

Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala
 195 200 205

Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala
 210 215 220

Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr
 225 230 235 240

Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe
 245 250 255

Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu
 260 265 270

Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg
 275 280 285

Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala
 290 295 300

Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
 305 310 315 320

Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
 325 330 335

His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
 340 345 350

Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala
 355 360 365

Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys
 370 375 380

Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe
 385 390 395 400

Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile
 405 410 415

Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala
 420 425 430

Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu
 435 440 445

Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His
 450 455 460

Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln
 465 470 475 480

Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg
 485 490 495

Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp
 500 505 510

Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg

515					520					525					
Ser	Ile	Leu	Pro	Trp	Thr	Ser	Val	Tyr	Val	Ala	Asp	Ser	Leu	Gly	Gly
530						535					540				
Leu	Val	Ser	Ala	Leu	Ser	Asp	Glu	Ser	Asn	Gln	Pro	Lys	Arg	Ala	Asn
545					550					555					560
Glu	Lys	Val	Arg	Leu	Gly	Phe	Val	Phe	Thr	Gly	Gln	Gly	Ala	Gln	Trp
				565					570					575	
His	Ala	Met	Gly	Arg	Glu	Leu	Val	Asn	Thr	Phe	Pro	Val	Phe	Lys	Gln
			580					585					590		
Ala	Ile	Leu	Glu	Cys	Asp	Gly	Tyr	Ile	Lys	Gln	Leu	Gly	Ala	Ser	Trp
		595					600					605			
Asn	Phe	Met	Glu	Glu	Leu	His	Arg	Asp	Glu	Leu	Thr	Thr	Arg	Val	Asn
						615						620			
Asp	Ala	Glu	Tyr	Ser	Leu	Pro	Leu	Ser	Thr	Ala	Ile	Gln	Ile	Ala	Leu
625					630					635					640
Val	Arg	Leu	Leu	Trp	Ser	Trp	Gly	Ile	Arg	Pro	Thr	Gly	Ile	Thr	Ser
				645					650					655	
His	Ser	Ser	Gly	Glu	Ala	Ala	Ala	Ala	Tyr	Ala	Ala	Gly	Ala	Leu	Ser
			660					665					670		
Ala	Arg	Ser	Ala	Ile	Gly	Ile	Thr	Tyr	Ile	Arg	Gly	Val	Leu	Thr	Thr
			675				680					685			
Lys	Pro	Lys	Pro	Ala	Leu	Ala	Ala	Lys	Gly	Gly	Met	Met	Ala	Val	Gly
						695					700				
Leu	Gly	Arg	Ser	Glu	Thr	Asn	Val	Tyr	Ile	Ser	Arg	Leu	Asn	Gln	Glu
705					710					715					720

Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr
 725 730 735

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His
 740 745 750

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His
 755 760 765

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg
 770 775 780

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr
 785 790 795 800

Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr
 805 810 815

Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu
 820 825 830

Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
 835 840 845

Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His
 850 855 860

Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu
 865 870 875 880

Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser
 885 890 895

Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
 900 905 910

Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
 915 920 925

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
 930 935 940

Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
 945 950 955 960

Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
 965 970 975

Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
 980 985 990

Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
 995 1000 1005

Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
 1010 1015 1020

Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
 1025 1030 1035

Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu
 1040 1045 1050

Val Asp Leu Arg Leu Thr Ile Arg Ser Cys Glu Glu Arg Ser Leu
 1055 1060 1065

Gly Thr Lys Asn Trp His Gln Phe Ser Val His Ser Ile Ser Gly
 1070 1075 1080

Glu Asn Asn Thr Trp Thr Glu His Cys Thr Gly Leu Ile Arg Ser
 1085 1090 1095

Glu Ser Glu Arg Ser His Leu Asp Cys Ser Thr Val Glu Ala Ser
 1100 1105 1110

Arg Arg Leu Asn Leu Gly Ser Asp Asn Arg Ser Ile Asp Pro Asn

1115		1120		1125
Asp Leu Trp Glu Ser Leu His	Ala Asn Gly Ile Cys	His Gly Pro		
1130	1135	1140		
Ile Phe Gln Asn Ile Gln Arg	Ile Gln Asn Asn Gly	Gln Gly Ser		
1145	1150	1155		
Phe Cys Arg Phe Ser Ile Ala	Asp Thr Ala Ser Ala	Met Pro His		
1160	1165	1170		
Ser Tyr Glu Asn Arg His Ile	Val His Pro Thr Thr	Leu Asp Ser		
1175	1180	1185		
Val Ile Gln Ala Ala Tyr Thr	Val Leu Pro Tyr Ala	Gly Thr Arg		
1190	1195	1200		
Met Lys Thr Ala Met Val Pro	Arg Arg Leu Arg Asn	Val Lys Ile		
1205	1210	1215		
Ser Ser Ser Leu Ala Asp Leu	Glu Ala Gly Asp Ala	Leu Asp Ala		
1220	1225	1230		
Gln Ala Ser Ile Lys Asp Arg	Asn Ser Gln Ser Phe	Ser Thr Asp		
1235	1240	1245		
Leu Ala Val Phe Asp Asp Tyr	Asp Ser Gly Ser Ser	Pro Ser Asp		
1250	1255	1260		
Gly Ile Pro Val Ile Glu Ile	Glu Gly Leu Val Phe	Gln Ser Val		
1265	1270	1275		
Gly Ser Ser Phe Ser Asp Gln	Lys Ser Asp Ser Asn	Asp Thr Glu		
1280	1285	1290		
Asn Ala Cys Ser Ser Trp Val	Trp Ala Pro Asp Ile	Ser Leu Gly		
1295	1300	1305		

Asp	Ser	Thr	Trp	Leu	Lys	Glu	Lys	Leu	Ser	Thr	Glu	Ala	Glu	Thr
1310						1315					1320			
Lys	Glu	Thr	Glu	Leu	Met	Met	Asp	Leu	Arg	Arg	Cys	Thr	Ile	Asn
1325						1330					1335			
Phe	Ile	Gln	Glu	Ala	Val	Thr	Asp	Leu	Thr	Asn	Ser	Asp	Ile	Gln
1340						1345					1350			
His	Leu	Asp	Gly	His	Leu	Gln	Lys	Tyr	Phe	Asp	Trp	Met	Asn	Val
1355						1360					1365			
Gln	Leu	Asp	Leu	Ala	Arg	Gln	Asn	Lys	Leu	Ser	Pro	Ala	Ser	Cys
1370						1375					1380			
Asp	Trp	Leu	Ser	Asp	Asp	Ala	Glu	Gln	Lys	Lys	Cys	Leu	Gln	Ala
1385						1390					1395			
Arg	Val	Ala	Gly	Glu	Ser	Val	Asn	Gly	Glu	Met	Ile	Ser	Arg	Leu
1400						1405					1410			
Gly	Pro	Gln	Leu	Ile	Ala	Met	Leu	Arg	Arg	Glu	Thr	Glu	Pro	Leu
1415						1420					1425			
Glu	Leu	Met	Met	Gln	Asp	Gln	Leu	Leu	Ser	Arg	Tyr	Tyr	Val	Asn
1430						1435					1440			
Ala	Ile	Lys	Trp	Ser	Arg	Ser	Asn	Ala	Gln	Ala	Ser	Glu	Leu	Ile
1445						1450					1455			
Arg	Leu	Cys	Ala	His	Lys	Asn	Pro	Arg	Ser	Arg	Ile	Leu	Glu	Ile
1460						1465					1470			
Gly	Gly	Gly	Thr	Gly	Gly	Cys	Thr	Lys	Leu	Ile	Val	Asn	Ala	Leu
1475						1480					1485			
Gly	Asn	Thr	Lys	Pro	Ile	Asp	Arg	Tyr	Asp	Phe	Thr	Asp	Val	Ser
1490						1495					1500			

Ala	Gly	Phe	Phe	Glu	Ser	Ala	Arg	Glu	Gln	Phe	Ala	Asp	Trp	Gln
1505						1510					1515			
Asp	Val	Met	Thr	Phe	Lys	Lys	Leu	Asp	Ile	Glu	Ser	Asp	Pro	Glu
1520						1525					1530			
Gln	Gln	Gly	Phe	Glu	Cys	Ala	Thr	Tyr	Asp	Val	Val	Val	Ala	Cys
1535						1540					1545			
Gln	Val	Leu	His	Ala	Thr	Arg	Cys	Met	Lys	Arg	Thr	Leu	Ser	Asn
1550						1555					1560			
Val	Arg	Lys	Leu	Leu	Lys	Pro	Gly	Gly	Asn	Leu	Ile	Leu	Val	Glu
1565						1570					1575			
Thr	Thr	Arg	Asp	Gln	Leu	Asp	Leu	Phe	Phe	Thr	Phe	Gly	Leu	Leu
1580						1585					1590			
Pro	Gly	Trp	Trp	Leu	Ser	Glu	Glu	Pro	Glu	Arg	Lys	Ser	Thr	Pro
1595						1600					1605			
Ser	Leu	Thr	Thr	Asp	Leu	Trp	Asn	Thr	Met	Leu	Asp	Thr	Ser	Gly
1610						1615					1620			
Phe	Asn	Gly	Val	Glu	Leu	Glu	Val	Arg	Asp	Cys	Glu	Asp	Asp	Glu
1625						1630					1635			
Phe	Tyr	Met	Ile	Ser	Thr	Met	Leu	Ser	Thr	Ala	Arg	Lys	Glu	Asn
1640						1645					1650			
Thr	Thr	Pro	Asp	Thr	Val	Ala	Glu	Ser	Glu	Val	Leu	Leu	Leu	His
1655						1660					1665			
Gly	Ala	Leu	Arg	Pro	Pro	Ser	Ser	Trp	Leu	Glu	Ser	Leu	Gln	Ala
1670						1675					1680			
Ala	Ile	Cys	Glu	Lys	Thr	Ser	Ser	Ser	Pro	Ser	Ile	Asn	Ala	Leu

1685		1690		1695
Gly Glu Val Asp Thr Thr	Gly Arg Thr Cys Ile Phe	Leu Gly Glu		
1700	1705	1710		
Met Glu Ser Ser Leu Leu	Gly Glu Val Gly Ser Glu	Thr Phe Lys		
1715	1720	1725		
Ser Ile Thr Ala Met Leu	Asn Asn Cys Asn Ala Leu	Leu Trp Val		
1730	1735	1740		
Ser Arg Gly Ala Ala Met	Ser Ser Glu Asp Pro Trp	Lys Ala Leu		
1745	1750	1755		
His Ile Gly Leu Leu Arg	Thr Ile Arg Asn Glu Asn	Asn Gly Lys		
1760	1765	1770		
Glu Tyr Val Ser Leu Asp	Leu Asp Pro Ser Arg Asn	Ala Tyr Thr		
1775	1780	1785		
His Glu Ser Leu Tyr Ala	Ile Cys Asn Ile Phe Asn	Gly Arg Leu		
1790	1795	1800		
Gly Asp Leu Ser Glu Asp	Lys Glu Phe Glu Phe Ala	Glu Arg Asn		
1805	1810	1815		
Gly Val Ile His Val Pro	Arg Leu Phe Asn Asp Pro	His Trp Lys		
1820	1825	1830		
Asp Gln Glu Ala Val Glu	Val Thr Leu Gln Pro Phe	Glu Gln Pro		
1835	1840	1845		
Gly Arg Arg Leu Arg Met	Glu Val Glu Thr Pro Gly	Leu Leu Asp		
1850	1855	1860		
Ser Leu Gln Phe Arg Asp	Asp Glu Gly Arg Glu Gly	Lys Asp Leu		
1865	1870	1875		

Pro	Asp	Asp	Trp	Val	Glu	Ile	Glu	Pro	Lys	Ala	Phe	Gly	Leu	Asn
	1880					1885					1890			
Phe	Arg	Asp	Val	Met	Val	Ala	Met	Gly	Gln	Leu	Glu	Ala	Asn	Arg
	1895					1900					1905			
Val	Met	Gly	Phe	Glu	Cys	Ala	Gly	Val	Ile	Thr	Lys	Leu	Gly	Gly
	1910					1915					1920			
Ala	Ala	Ala	Ala	Ser	Gln	Gly	Leu	Arg	Leu	Gly	Asp	Arg	Val	Cys
	1925					1930					1935			
Ala	Leu	Leu	Lys	Gly	His	Trp	Ala	Thr	Arg	Thr	Gln	Thr	Pro	Tyr
	1940					1945					1950			
Thr	Asn	Val	Val	Arg	Ile	Pro	Asp	Glu	Met	Gly	Phe	Pro	Glu	Ala
	1955					1960					1965			
Ala	Ser	Val	Pro	Leu	Ala	Phe	Thr	Thr	Ala	Tyr	Ile	Ala	Leu	Tyr
	1970					1975					1980			
Thr	Thr	Ala	Lys	Leu	Arg	Arg	Gly	Glu	Arg	Val	Leu	Ile	His	Ser
	1985					1990					1995			
Gly	Ala	Gly	Gly	Val	Gly	Gln	Ala	Ala	Ile	Ile	Leu	Ser	Gln	Leu
	2000					2005					2010			
Ala	Gly	Ala	Glu	Val	Phe	Val	Thr	Ala	Gly	Thr	Gln	Ala	Lys	Arg
	2015					2020					2025			
Asp	Phe	Val	Gly	Asp	Lys	Phe	Gly	Ile	Asn	Pro	Asp	His	Ile	Phe
	2030					2035					2040			
Ser	Ser	Arg	Asn	Asp	Leu	Phe	Val	Asp	Gly	Ile	Lys	Ala	Tyr	Thr
	2045					2050					2055			
Gly	Gly	Leu	Gly	Val	His	Val	Val	Leu	Asn	Ser	Leu	Ala	Gly	Gln
	2060					2065					2070			

Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe
 2075 2080 2085

Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp
 2090 2095 2100

Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu
 2105 2110 2115

Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu
 2120 2125 2130

Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
 2135 2140 2145

Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
 2150 2155 2160

Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
 2165 2170 2175

Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
 2180 2185 2190

Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
 2195 2200 2205

Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
 2210 2215 2220

Ala Lys His Leu Ile Ile Leu Ser Arg Ser Ala Lys Ala Ser Pro
 2225 2230 2235

Phe Ile Thr Ser Leu Gln Asn Gln Gln Cys Ala Val Tyr Leu His
 2240 2245 2250

Ala Cys Asp Ile Ser Asp Gln Asp Gln Val Thr Lys Val Leu Arg

2255		2260		2265
Leu Cys Glu Glu Ala His	Ala Pro Pro Ile Arg	Gly Ile Ile Gln		
2270	2275	2280		
Gly Ala Met Val Leu Lys	Asp Ala Leu Leu Ser	Arg Met Thr Leu		
2285	2290	2295		
Asp Glu Phe Asn Ala Ala	Thr Arg Pro Lys Val	Gln Gly Ser Trp		
2300	2305	2310		
Tyr Leu His Lys Ile Ala	Gln Asp Val Asp Phe	Phe Val Met Leu		
2315	2320	2325		
Ser Ser Leu Val Gly Val	Met Gly Gly Ala Gly	Gln Ala Asn Tyr		
2330	2335	2340		
Ala Ala Ala Gly Ala Phe	Gln Asp Ala Leu Ala	His His Arg Arg		
2345	2350	2355		
Ala His Gly Met Pro Ala	Val Thr Ile Asp Leu	Gly Met Val Lys		
2360	2365	2370		
Ser Val Gly Tyr Val Ala	Glu Thr Gly Arg Gly	Val Ala Asp Arg		
2375	2380	2385		
Leu Ala Arg Ile Gly Tyr	Lys Pro Met His Glu	Lys Asp Val Met		
2390	2395	2400		
Asp Val Leu Glu Lys Ala	Ile Leu Cys Ser Ser	Pro Gln Phe Pro		
2405	2410	2415		
Ser Pro Pro Ala Ala Val	Val Thr Gly Ile Asn	Thr Ser Pro Gly		
2420	2425	2430		
Ala His Trp Thr Glu Ala	Asn Trp Ile Gln Glu	Gln Arg Phe Val		
2435	2440	2445		

Gly Leu Lys Tyr Arg Gln Val Leu His Ala Asp Gln Ser Phe Val
 2450 2455 2460

Ser Ser His Lys Lys Gly Pro Asp Gly Val Arg Ala Gln Leu Ser
 2465 2470 2475

Arg Val Thr Ser His Asp Glu Ala Ile Ser Ile Val Leu Lys Ala
 2480 2485 2490

Met Thr Glu Lys Leu Met Arg Met Phe Gly Leu Ala Glu Asp Asp
 2495 2500 2505

Met Ser Ser Ser Lys Asn Leu Ala Gly Val Gly Val Asp Ser Leu
 2510 2515 2520

Val Ala Ile Glu Leu Arg Asn Trp Ile Thr Ser Glu Ile His Val
 2525 2530 2535

Asp Val Ser Ile Phe Glu Leu Met Asn Gly Asn Thr Ile Ala Gly
 2540 2545 2550

Leu Val Glu Leu Val Val Ala Lys Cys Ser
 2555 2560

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5

10

15

acc cct caa gcc ctt gtg gcg gtc gca gtg ctt ctt agt ctc atc gcc

96

Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala

20

25

30

tac cgt ttg cgg ggg cgc cag tcc gaa ctg caa gtc tat aat ccc aaa

144

Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys

35

40

45

aaa tgg tgg gag ttg acg acc atg agg gct agg cag gac ttc gat acg

192

Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr

50

55

60

tat ggt ccg agc tgg atc gaa gct tgg ttc tcg aaa aac gac aag ccc

240

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro

65

70

75

80

ctg cgc ttc att gtt gat tcc ggc tat tgc acc atc ctc cca tcg tcc

288

Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser

85

90

95

atg gcc gac gag ttt cgg aaa atc aaa gat atg tgc atg tac aag ttt

336

Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe

100

105

110

ttg gcg gat gac ttt cac tct cat ctc cct gga ttc gac ggg ttc aag
 384
 Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys

115

120

125

gaa atc tgc cag gat gca cat ctt gtc aac aaa gtt gtt ttg aac cag
 432
 Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln

130

135

140

tta caa acc caa gcc ccc aag tac aca aag cca ttg gct acc ttg gcc
 480
 Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala

145

150

155

160

gac gct act att gcc aag ttg ttc ggt aaa agc gag gag tgg caa acc
 528
 Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr

165

170

175

gca cct gtc tat tcc aat gga ttg gac ctt gtc aca cga aca gtc aca
 576
 Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr

180

185

190

ctc att atg gtc ggc gac aaa atc tgc cac aat gag gag tgg ctg gat
 624
 Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp

195

200

205

att gca aag aac cat gcc gtg agt gtg gcg gta caa gct cgc caa ctt
 672
 Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu

210

215

220

cgc gta tgg ccc atg cta ctg cga ccg ctc gct cac tgg ttt caa ccg

720

Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro

225

230

235

240

caa gga cgc aaa ttg cgt gac caa gtg cgc cgc gca cga aag atc att

768

Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile

245

250

255

gat cct gag att cag cga cga cgt gct gaa aag gcc gca tgt gta gcg

816

Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala

260

265

270

aag ggc gtg cag ccg ccc cag tac gtc gat acc atg caa tgg ttt gaa

864

Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu

275

280

285

gac acc gcc gac ggc cgc tgg tac gat gtg gcg ggt gct cag ctc gct

912

Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala

290

295

300

atg gat ttc gcc ggc atc tac gcc tcg acg gat ctt ttc gtc ggt gcc

960

Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala

305

310

315

320

ctt gtg gac att gcc agg cac cca gac ctt att cag cct ctc cgc caa

1008

Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln

325

330

335

gag atc cgc act gta atc gga gaa ggg ggc tgg acg cct gcc tct ctg

1056

Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu

340

345

350

ttc aag ctg aag ctc ctc gac agc tgc atg aaa gag acg cag cga atc

1104

Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile

355

360

365

aag ccg gtc gag tgc gcc act atg cgc agt acc gct ctc aga gac atc

1152

Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile

370

375

380

act cta tcc aat ggc ctc ttc att ccc aag ggc gag ttg gcc gct gtg

1200

Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val

385

390

395

400

gct gca gac cgc atg aac aac cct gat gtg tgg gaa aac ccc gaa aat

1248

Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn

405

410

415

tat gat ccc tac cga ttt atg cgc atg cgc gag gat cca gac aag gcc

1296

Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala

420

425

430

ttc acc gct caa ttg gag aat acc aac ggt gat cac atc ggc ttc ggc

1344

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly

435

440

445

tgg aac cca cgc gct tgt ccc ggg cgg ttc ttc gcc tcg aag gaa atc

1392

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile

450 455 460

aag att ctc ctc gct cat ata ctg att cag tat gat gtg aag cct gta
 1440
 Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val

465 470 475 480

cca gga gac gat gac aaa tac tac cgt cac gct ttt agc gtt cgt atg
 1488
 Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met

485 490 495

cat cca acc aca aag ctc atg gta cgc cgg cgc aac gag gac atc ccg
 1536
 His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro

500 505 510

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 1557
 Leu Pro His Asp Arg Cys

515

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<211> 518

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<213> Penicillium citrinum

<400> 48

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Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala

20

25

30

Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys
 35 40 45

Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr
 50 55 60

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro
 65 70 75 80

Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser
 85 90 95

Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe
 100 105 110

Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys
 115 120 125

Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln
 130 135 140

Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala
 145 150 155 160

Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr
 165 170 175

Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr
 180 185 190

Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp
 195 200 205

Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu
 210 215 220

Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro
225 230 235 240

Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
245 250 255

Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
260 265 270

Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
275 280 285

Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
290 295 300

Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
305 310 315 320

Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
325 330 335

Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu
340 345 350

Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
355 360 365

Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
370 375 380

Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
385 390 395 400

Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
405 410 415

Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
420 425 430

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
 435 440 445

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
 450 455 460

Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
 465 470 475 480

Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
 485 490 495

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
 500 505 510

Leu Pro His Asp Arg Cys
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<210> 49

<211> 3522

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(3522)

<400> 49

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Met Val Ala Ser Leu Leu Pro Ser Arg Phe Arg Gly Arg Glu Ser Met

1

5

10

15

aat cag cag cac cct cta cgc tcg gga aat cgg gca ttg acc tcc aca
 96
 Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr

20

25

30

ctc caa ttt cta tcc aaa acg gcg tgt cta cac ccg atc cat acc gtt
 144
 Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val

35

40

45

tgc acc ata gct att cta gct agt acc aca tac gtt gga cta ctc aaa
 192
 Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys

50

55

60

gac agc ttc ttc cat ggc ccc gca aac gtt gat aaa gca gaa tgg ggc
 240
 Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly

65

70

75

80

tct ttg gtc gaa gga agt cga agc ttg atc acc ggc cca cag aat ggc
 288
 Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly

85

90

95

tgg aag tgg cag agc ttc gac ggg gat gca gat gtt ctc gga gat ttc
 336
 Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe

100

105

110

aac cat caa gca cta atg acc ttg gta ttc ccg ggg tca tat ggg gtt
 384
 Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val

115

120

125

gca tct caa gca gcc tca cca ttc ctt gct ccc ctc cct gtg aac cta

432
Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
130 135 140

tct gtg att gac ctt ccc tca acg tcg agc cct tta acc gcc tat tcg
480
Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
145 150 155 160

aaa gat aaa gtt ttc gcc ttc tct gtg gaa tac agc agc gcg ccg gaa
528
Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
165 170 175

ctc gtg gct gct gtt caa gaa atc ccc aac aac agt gcc gac ctg aaa
576
Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
180 185 190

ttg cag gag acg caa ttg atc gag atg gaa cgc cag atg tgg atc atg
624
Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
195 200 205

aag gct gcc agg gct cac aca aaa cgc agc ctt gct caa tgg gtg cac
672
Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
210 215 220

gat acc tgg aca gag tct ctt gat ctt atc aag agc gct caa acg ctc
720
Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
225 230 235 240

gac gtg gtt gtc atg gtg cta ggt tat ata tca atg cac ttg act ttc
768

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe

245

250

255

gtc tca ctc ttc ctc agc atg aaa aaa ttg gga tcg aag gtt tgg ctg
816

Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu

260

265

270

gct aca agc gtc ctt ttg tcg tca aca ttt gcc ttt ctc ctc ggt ctc
864

Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu

275

280

285

gac gtg gcc ata aga cta ggg gtt ccg atg agc atg agg ttg cta tcc
912

Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser

290

295

300

gaa ggc ctc ccc ttc ttg gtg gtg atc gtt ggc ttt gag aag agc atc
960

Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile

305

310

315

320

act ctg acc agg gct gtt ttg tcc tat gct gtg cag cac cga aag ccc
1008

Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro

325

330

335

cag aag ata cag tct gac cag ggt agc gtg aca gcc att gct gaa agt
1056

Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser

340

345

350

acc atc aat tac gcc gta cga agc gcc att cgg gag aag ggt tac aat
1104

Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn

355	360	365
atc gtg tgc cac tac gtg gtc gag atc ctg ctc cta gtt atc ggt gct		
1152		
Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala		
370	375	380
gtc tta ggc atc caa ggt ggg cta cag cac ttc tgt gtt cta gct gca		
1200		
Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala		
385	390	395
400		
ttg atc ctg ttc ttt gac tgt ctg ctg ctg ttt aca ttc tac act gcg		
1248		
Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala		
405	410	415
att ctg tct atc aag ctc gag gta aac cgc ctc aaa cgt cat atc aac		
1296		
Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn		
420	425	430
atg cgg tac gcg ttg gaa gat gag ggt ctc agt cag cgg acg gcg gag		
1344		
Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu		
435	440	445
agt gtc gcg acc agc aat gat gcc caa gac agt gca cgt aca tat ctg		
1392		
Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu		
450	455	460
ttt ggc aat gat atg aaa ggc agc agt gtt ccg aag ttc aaa ttc tgg		
1440		
Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp		

465 470 475 480

atg gtc gtt ggt ttc ctt atc gtc aac ctc gtc aac atc ggc tcc acc
1488

Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr

485

490

495

ctt ttc caa gcc tct tct agt gga tcg ttg tcc agt ata tca tct tgg
1536

Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp

500

505

510

acc gaa agt ctg agc gga tcg gcc att aaa ccc ccg ctt gag ccc ttc
1584

Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe

515

520

525

aag gta gct gga agt gga cta gat gaa cta ctt ttc cag gca aga ggg
1632

Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly

530

535

540

cgc ggt caa tcg act atg gtc act gtc ctc gcc ccc atc aag tac gaa
1680

Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu

545

550

555

560

cta gag tat cct tcc att cac cgt ggt acc tcg cag cta cac gag tat
1728

Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr

565

570

575

gga gtt ggt gga aaa atg gtc ggt agc ctg ctc acc agc ctg gaa gat
1776

Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp

580

585

590

ccc gtc ctc tcc aaa tgg gtg ttt gtg gca ctt gcc cta agt gtc gct
1824

Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala

595

600

605

ctg aac agc tat ctg ttc aag gcc gcc aga ctg gga atc aaa gat cct
1872

Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro

610

615

620

aat ctc ccg agt cac cca gtt gat cca gtt gag ctt gac cag gcc gaa
1920

Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu

625

630

635

640

agc ttc aac gct gcc cag aac cag acc cct cag att caa tca agt ctc
1968

Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu

645

650

655

caa gct cct cag acc aga gtg ttc act cct acc acc acc gac agt gac
2016

Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp

660

665

670

agt gat gcc tca tta gtc tta att aaa gca tct cta aag gtc act aag
2064

Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys

675

680

685

cga gca gaa gga aag aca gcc act agt gaa ctt ccc gtg tct cgc aca
2112

Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr

690

695

700

caa atc gaa ctg gac aat ttg ctg aag cag aac aca atc agc gag ttg
2160

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu

705

710

715

720

aac gat gag gat gtc gtt gcc ttg tct ttg cgg gga aag gtt ccc ggg
2208

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly

725

730

735

tat gcc cta gag aag agt ctc aaa gac tgc act cgt gcc gtc aag gtt
2256

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val

740

745

750

cgc cgc tct atc att tcg agg aca ccg gct acc gca gag ctt aca agt
2304

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser

755

760

765

atg ctg gag cac tcg aag ctg ccg tac gaa aac tac gcc tgg gaa cgc
2352

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg

770

775

780

gtg ctc ggt gca tgt tgc gag aac gtt att ggc tat atg cca gtc cct
2400

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro

785

790

795

800

gtt ggc gtc gcc ggt cct att gtt atc gac ggc aag agt tat ttc att
2448

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile

805

810

815

cct atg gca acc acc gag ggc gtc ctc gtc gct agt gct agc cgt ggc

2496

Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly

820

825

830

agt aag gca atc aac ctc ggt ggc ggt gcc gtg aca gtc ctg act ggc

2544

Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly

835

840

845

gac ggt atg aca cga ggc ccg tgt gtg aag ttt gat gtc ctt gaa cga

2592

Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg

850

855

860

gct ggt gct gct aag atc tgg ctc gat tcg gac gtc ggc cag acc gta

2640

Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val

865

870

875

880

atg aaa gaa gcc ttc aat tca acc agc aga ttt gcg cgc tta caa agt

2688

Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser

885

890

895

atg cgg aca act atc gcc ggt act cac tta tat att cga ttt aag act

2736

Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr

900

905

910

act act ggc gac gct atg gga atg aat atg att tct aag ggc gtg gag

2784

Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu

915

920

925

cat gca ctg aat gtt atg gcg aca gag gca ggt ttc agc gat atg aat

2832

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn

930

935

940

att att acc cta tca gga aat tac tgt acg gat aag aaa cct tca gct
2880

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala

945

950

955

960

ttg aat tgg atc gat gga cgg ggc aag ggc att gtg gcc gaa gcc atc
2928

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile

965

970

975

ata ccg gcg aac gtt gtc agg gat gtc tta aag agc gat gtg gat agc
2976

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser

980

985

990

atg gtt cag ctc aac ata tcg aaa aat ctg att ggg tcc gct atg gct
3024

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala

995

1000

1005

ggc tca gtt ggc ggc ttc aac gcc caa gct gcc aat ctt gcg gca
3069

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala

1010

1015

1020

gcc att ttc att gcc aca ggt cag gat ccg gcg caa gtt gtg gag
3114

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu

1025

1030

1035

agc gct aac tgc atc act ctc atg aac aat ctt cgc gga tcg ctt
3159

Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu

1040	1045	1050
caa atc tct gtc tcc atg ccg 3204	tct att gag gtt gga	acg ttg ggc
Gln Ile Ser Val Ser Met Pro	Ser Ile Glu Val Gly	Thr Leu Gly
1055	1060	1065
ggt ggt acg att ctg gag ccc 3249	cag ggc gca atg ctt	gac atg ctt
Gly Gly Thr Ile Leu Glu Pro	Gln Gly Ala Met Leu	Asp Met Leu
1070	1075	1080
ggt gtc cgc gga tca cac ccg 3294	acc act ccc ggt gag	aat gca cgt
Gly Val Arg Gly Ser His Pro	Thr Thr Pro Gly Glu	Asn Ala Arg
1085	1090	1095
caa ctt gcg cgc atc atc gga 3339	agc gct gtt ttg gct	ggg gag ctc
Gln Leu Ala Arg Ile Ile Gly	Ser Ala Val Leu Ala	Gly Glu Leu
1100	1105	1110
tcg cta tgt gct gcc cta gcc 3384	gcc ggt cac ctg gtc	aag gcg cac
Ser Leu Cys Ala Ala Leu Ala	Ala Gly His Leu Val	Lys Ala His
1115	1120	1125
atg gcg cac aac cgt tct gcc 3429	ccg gca tct tca gcc	cct tct cga
Met Ala His Asn Arg Ser Ala	Pro Ala Ser Ser Ala	Pro Ser Arg
1130	1135	1140
agt gtc tcc ccg tca ggc gga 3474	acc agg aca gtc cct	gtt cct aac
Ser Val Ser Pro Ser Gly Gly	Thr Arg Thr Val Pro	Val Pro Asn

1145

1150

1155

aat gca ctg agg ccg agt gct gca gct act gat cgg gct cga cgc
3519

Asn Ala Leu Arg Pro Ser Ala Ala Ala Thr Asp Arg Ala Arg Arg

1160

1165

1170

tga
3522

<210> 50

<211> 1173

<212> PRT

<213> *Penicillium citrinum*

<400> 50

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1 5 10 15

Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr
20 25 30

Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val
35 40 45

Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys
50 55 60

Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly
65 70 75 80

Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly
85 90 95

Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe
 100 105 110

Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val
 115 120 125

Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
 130 135 140

Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
 145 150 155 160

Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
 165 170 175

Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
 180 185 190

Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
 195 200 205

Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
 210 215 220

Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
 225 230 235 240

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
 245 250 255

Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
 260 265 270

Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
 275 280 285

Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
 290 295 300

Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile
 305 310 315 320

Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
 325 330 335

Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
 340 345 350

Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn
 355 360 365

Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala
 370 375 380

Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala
 385 390 395 400

Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala
 405 410 415

Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn
 420 425 430

Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu
 435 440 445

Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu
 450 455 460

Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp
 465 470 475 480

Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr
 485 490 495

Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp

500

505

510

Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe
 515 520 525

Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly
 530 535 540

Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu
 545 550 555 560

Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr
 565 570 575

Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp
 580 585 590

Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala
 595 600 605

Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro
 610 615 620

Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu
 625 630 635 640

Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu
 645 650 655

Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp
 660 665 670

Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys
 675 680 685

Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr
 690 695 700

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu
705 710 715 720

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly
725 730 735

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val
740 745 750

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser
755 760 765

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg
770 775 780

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro
785 790 795 800

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile
805 810 815

Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
820 825 830

Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly
835 840 845

Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
850 855 860

Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
865 870 875 880

Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser
885 890 895

Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
900 905 910

Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
 915 920 925

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
 930 935 940

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
 945 950 955 960

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
 965 970 975

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
 980 985 990

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
 995 1000 1005

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
 1010 1015 1020

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu
 1025 1030 1035

Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu
 1040 1045 1050

Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly
 1055 1060 1065

Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu
 1070 1075 1080

Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg
 1085 1090 1095

Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu

1100	1105	1110
Ser Leu Cys Ala Ala Leu Ala Ala Gly His Leu Val Lys Ala His		
1115	1120	1125
Met Ala His Asn Arg Ser Ala Pro Ala Ser Ser Ala Pro Ser Arg		
1130	1135	1140
Ser Val Ser Pro Ser Gly Gly Thr Arg Thr Val Pro Val Pro Asn		
1145	1150	1155
Asn Ala Leu Arg Pro Ser Ala Ala Ala Thr Asp Arg Ala Arg Arg		
1160	1165	1170

<210> 51

<211> 20

<212> DNA

<213> Penicillium citrinum

<400> 51

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20

<210> 52

<211> 20

<212> DNA

<213> Penicillium citrinum

<400> 52

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